
United States
Circuit Court of Appeals
For the Ninth Circuit

Transcript of Record

GEORGE J. HENRY, Jr.,
Complainant.

vs.

CITY OF LOS ANGELES,
Defendant.

VOLUME 1
(Pages 1 to 400 Inclusive)

Upon Appeal from the United States District Court for
the Southern District of California,
Southern Division

FILED

JAN 4 - 1918

F. D. MONCATHY

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Names and Addresses of Attorneys.

For Complainant:

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For Defendant:

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Angeles, California, and
FREDERICK S. LYON, 504 Merchants Trust
Bldg., Los Angeles, California.

*United States District Court, Southern District of Cali-
fornia, Southern Division.*

IN EQUITY FOR INFRINGEMENT OF LETTERS
PATENT.

GEORGE J. HENRY,
Complainant,

vs.

CITY OF LOS ANGELES,
Defendant.

Bill of Complaint.

TO THE HONORABLE THE JUDGE OF THE DIS-
TRICT COURT OF THE UNITED STATES IN AND
FOR THE SOUTHERN DISTRICT OF CALIFOR-
NIA, SOUTHERN DIVISION:

George J. Henry, Jr., a citizen of the State of Cali-
fornia, and resident of San Francisco, County of San
Francisco, in said State, brings this, his Bill of Com-

plaint, against the City of Los Angeles, of Los Angeles County, California, a municipal corporation organized and existing under and by virtue of the laws of the State of California, defendant, and thereupon, complaining, shows unto your Honors:—

I.

That heretofore and prior to the thirteenth (13th) day of September, A. D. 1900, one Lamar Lyndon, of New York, New York, was the original, first and sole inventor of a certain new and useful Electromechanical Water-Wheel Governor, etc., not known or used by others before his invention or discovery thereof, or patented or described in any printed publication in the United States of America or any foreign country, before his invention or discovery thereof, or more than two years prior to his application for Letters Patent thereon in the United States of America, or in public use or on sale in the United States of America for more than two years prior to his said application for Letters Patent of the United States of America therefor, and not abandoned.

II.

That said Lamar Lyndon, so being the original, first and sole inventor of said Electromechanical Water-Wheel Governor, etc., to-wit on September 13, 1900, made application in writing in due form of law to the Commissioner of Patents of the United States of America, in accordance with the then existing laws of the United States in such case made and provided, and complied in all respects with the conditions and requirements of said law; that thereafter such proceedings were duly and regularly had and taken in the matter of such

application, that, to-wit, on March 11, 1902, Letters Patent of the United States, Number 695,220, were duly and regularly granted, issued, and delivered by the Government of the United States to said Lamar Lyndon, whereby there was granted and secured to said Lamar Lyndon, his heirs, legal representatives and assigns, for the full term of seventeen (17) years from and after said 11th day of March, 1902, the sole, exclusive right, liberty and privilege to make, use and vend the said invention throughout the United States of America and the territories thereof; that the said Letters Patent were duly issued in due form of law under the seal of the United States Patent Office and duly signed by the acting Commissioner of Patents, all as will more fully appear from said original Letters Patent which are ready in court to be produced by your orator; and that prior to the grant and issuance and delivery of said Letters Patent all proceedings were had and taken which were required by law to be had and taken prior to the issuance of Letters Patent for new and useful inventions.

III.

That the said invention so set forth, described and claimed in and by said Letters Patent No. 695,220 afore-said, is of great value, and that since the grant and issuance of said Letters Patent the said Electro-mechanical Water-Wheel Governor, etc., has gone into great and extensive use and the said defendant has been, long prior to the commencement of this suit, notified in writing of the grant and issuance of said Letters Patent No. 695,220 and of the rights of your orator and your orator's assignor thereunder, and demand has been

made upon said defendant to respect the said Letters Patent and not to infringe thereon, but notwithstanding such notice the defendant has continued to make and cause to be made and has used Electromechanical Water-Wheel Governors, etc., embodying the said invention, as hereinafter more particularly set forth.

IV.

And your orator further shows your Honors that the trade and public have generally respected and acquiesced in the validity and scope of said Letters Patent No. 695,220, and the exclusive rights of your orator and of your orator's assignor therein and thereunder, and save and expect for the infringement thereof by defendant, as hereinafter set forth, and possibly by a limited number of other parties, your orator and your orator's assignor have had and enjoyed the exclusive right, liberty and privilege, since March 11, 1902, of manufacturing, selling and using Electromechanical Water-Wheels, etc., embodying and containing the invention described in, set forth and claimed in said Letters Patent No. 695,220, and but for the wrongful and infringing acts of defendant, as herein set forth, and possibly of a limited number of other parties, your orator would now continue to enjoy the said exclusive rights and the same would be of great and incalculable benefit and advantage to your orator.

V.

And your orator further shows unto your Honors that heretofore, to-wit on July 7th, 1913, said Lamar Lyndon did sell, assign and transfer by an instrument in writing duly executed by him and delivered to your orator, all

the exclusive right, title and interest in and to said invention in Electromechanical Water-Wheel Governors, and in and to and under said Letters Patent No. 695,220, including in such assignment all rights of action, claims and demands of whatsoever nature arising out of or accruing from any past infringement of said Letters Patent.

VI.

And your orator further shows unto your Honors that notwithstanding the premises, but well knowing the same, and without the license or consent of your orator or your orator's assignor, and in violation of said Letters Patent and of your orator's' rights thereunder, the defendant herein, City of Los Angeles, has within the four years last past and at divers times and in the Southern District of California, Northern Division, to-wit, in the County of Inyo, State of California, and elsewhere, made and caused to be made and has used and is now using Electromechanical Water-Wheel Governors, etc., embodying, containing and embracing the invention described, claimed and patented in and by said Letters Patent, and has infringed upon the exclusive rights secured to your orator by virtue of said Letters Patent, and that the Electromechanical Water-Wheel Governors, etc., so made, caused to be made and used by defendant were and are infringements upon said Letters Patent, and each of the same contains in it the said patented invention; and that although requested so to do, defendant refuses to cease and desist from the infringement aforesaid and is now making or causing to be made and using Electromechanical Water-Wheel Governors, etc.,

containing and embracing the said patented invention, and threatens and intends to continue so to do and will continue so to do unless restrained by this Court; and is realizing, as your orator is informed and believes, large gains, profits and advantages, the exact amount of which is unknown to your orator; that by reason of the premises and the unlawful acts of the defendant aforesaid, your orator has suffered and is suffering great and irreparable injury and damage.

That for the wrongs and injuries herein complained of your orator has no plain, speedy or adequate remedy at law, and is without remedy save in a court of equity where matters of this kind are properly cognizable and relievable.

To the end, therefore, that the said defendant may, if it can show why your orator should not have the relief prayed, and may, according to the best and utmost of its knowledge, recollection, in formation and belief, but not under oath (an answer under oath being hereby expressly waived), full, true, and perfect answer make to all and singular the matters and things hereinabove charged, your orator prays that the defendant may be enjoined and restrained, both provisionally and perpetually, from further infringement upon said Letters Patent, and be decreed to account for and pay over to your orator the gains and profits realized by defendant from and by reason of the infringement aforesaid, together with costs of suit.

May it please your Honor to grant unto your orator a writ of injunction issued out of and under the seal of

this Court, provisionally and until the final hearing, enjoining, and restraining said defendant, City of Los Angeles, its attorneys, officers, agents, departments, boards, bureaus, servants and employees from making, causing to be made, or using any Electromechanical Water-Wheel Governors or the like containing or embracing the invention patented in and by said Letters Patent, and that upon the final hearing of this case said provisional injunction may be made final and perpetual, and that your orator may have such other and further relief as to your Honors may seem proper and in accordance with equity and good conscience.

May it please your Honors to grant unto your orator the write of subpoena issued out of and under the seal of this Court, directed to the defendant, City of Los Angeles, commanding it by a day certain and under a certain penalty fixed by law to be and appear before and under a certain penalty fixed by law to be and appear before this Honorable Court, then and there to answer this Bill of Complaint, and to stand to and perform and abide by such further orders and decrees as to your Honors may seem meet in the premises.

And your orator will ever pray.

(Signed) GEORGE J. HENRY, JR.

RAYMOND IVES BLAKESLEE,

Solicitor and of Counsel for Complainant.

State of California,

County of San Francisco,—ss.

George J. Henry, Jr., being first duly sworn, on oath says, that he is the Complainant in the above Bill of Complaint, that he has read said Bill of Complaint and

that the same is true of his own knowledge except as to such matters as are therein stated on information and belief, and as to such matters he believes said Bill to be true.

(Signed) GEORGE J. HENRY, JR.

Subscribed and sworn to before me,
this 12th day of September, 1913.

(Seal)

(Signed) L. B. RICHARDS,
Notary Public in and for San Francisco
County, State of California.

[TITLE OF COURT AND CAUSE.]

Answer.

Defendant, City of Los Angeles, answering the Bill of Complaint in the above entitled suit:

I.

Denies that one Lamar Lyndon was the original, first, or sole inventor of the alleged or any new or useful Electromechanical Water-Wheel Governor, etc., not known or used by others before his invention or discovery thereof, or patented or described in any printed publication in the United States of America or any foreign country before his pretended invention or discovery thereof, or more than two years prior to his alleged application for Letters Patent thereon in the United States of America, or in public use or on sale in the United States of America for more than two years prior to his said pretended application for Letters Patent of the United States of America therefor; denies that on September 13th, 1900, or at any time whatsoever,

said Lamar Lyndon made application in writing in due form of law to the Commissioner of Patents of the United States of America in accordance with the then existing law of the United States in such case made and provided, or complied in all or in any respect with the conditions or requirements of said law; denies that after the alleged or any proceedings were had or taken in the matter of said pretended application, the alleged or pretended Letters Patent of the United States alleged to be numbered 695,220, or any Letters Patent whatsoever, were on March 11th, 1902, or at any date whatsoever, granted or issued or delivered by the Government of the United States of America to said Lamar Lyndon; denies that by the said pretended Letters Patent the alleged or any sole or exclusive right, liberty, or privilege to make, use, or vend the said pretended invention in or throughout the United States of America, or the Territories thereof, or anywhere whatsoever, were granted or delivered to the said Lamar Lyndon, his heirs, legal representatives, or assigns, either for the full term of Seventeen (17) years from and after said 11th day of March, 1902, or for any time or term whatsoever; denies that the said alleged inventions so alleged to be set forth, described, and claimed in and by said pretended Letters Patent are of great or any value whatsoever; denies that since the pretended grant or issuance of said pretended Letters Patent the said Electromechanical Water-Wheel Governor, etc., has gone into great or extensive or any use whatsoever; denies that defendant has been, long prior to the commencement of this suit, or at any time, notified in writ-

ing of the grant or issuance of said Letters Patent, or of the alleged rights of the complainant or of complainant's assignor thereunder, or that the alleged or any demand has been made upon defendant to respect said pretended Letters Patent or not to infringe thereon; denies that this defendant has either prior or subsequent to the pretended notice or at any time whatsoever, made, or caused to be made, or has used, or has caused to be used Electromechanical Water-Wheel Governors, etc., embodying or containing the said alleged invention, or has ever intended so to do; denies that the trade or public have generally or at all respected or acquiesced in the validity or scope of said Letters Patent, or in or to the alleged exclusive right or rights of your orator or of your orator's alleged assignor therein or thereunder; denies that by any act of this defendant the complainant has suffered any damage or injury in any sum whatsoever; denies that except for the alleged infringement thereon by this defendant, as alleged in said bill of complainant, and possibly by a limited number of other parties, as alleged in the bill of complaint, complainant and complainant's assignor have had or enjoyed the exclusive right, liberty, or privilege since March 11th, 1902, or since any other time or date, or during any time whatsoever, of manufacturing, selling, or using Electromechanical Water-Wheel Governors, etc., embodying, or containing the alleged inventions alleged to be described, set forth, and claimed in and by said pretended Letters Patent.

II.

Denies that on July 7th, 1913, or at any other time,

said Lamar Lyndon did sell, assign, or transfer either by an instrument in writing or otherwise, or duly executed by him or delivered by him to complainant, all the exclusive or any right or title whatsoever in or to the right, title, and interest in or to said pretended inventions in Electromechanical Water-Wheel Governors, etc., or in or to or under said Letters Patent, or any or all rights of action, claims, or demands of whatsoever nature rising out of or accruing from any past infringement of said pretended Letters Patent.

III.

Denies that either with or without the license or consent of complainant or of complainant's alleged assignor or in violation of said Letters Patent or otherwise, or in violation of your orator's rights thereunder, this defendant has within the four years last past or at any time, either in the Southern District of California, Northern Division thereof, to-wit: in the County of Inyo, State of California, or at any place whatsoever, made or caused to be made, or has used, or is now using or making or causing to be made or to be used, any Electromechanical Water-Wheel Governors, etc., embodying or containing or embracing the pretended inventions described, claimed, or pretended to be patented in or by said pretended Letters Patent, or has any intention of so doing; denies that defendant has infringed upon the exclusive or any right or rights pretended to be secure to complainant by virtue of said pretended Letters Patent, or that any Electromechanical Water-Wheel Governor, etc., so made, caused to be made, or used by defendant is or are infringements upon or of said pre-

tended Letters Patent, or contains in it or them the said pretended patented invention; denies that by any use whatsoever of said pretended invention defendant has realized large or any profits, gains, or advantages whatsoever.

IV.

Further answering, upon information and belief, defendant alleges that the alleged or pretended improvements or invention purporting or pretended to be patented in or by said pretended Letters Patent No. 695,220 or things in all substantial and material respects the same as said alleged improvements or inventions had prior to the alleged or any invention or discovery thereof by the said Lamar Lyndon been patented or described in printed publications in the United States of America and in foreign countries, and particularly in and by the following Letters Patent, to-wit:

Letters Patent of France, No. 291,588, dated August 8th, 1899, granted to Societe Anonyme Des Ateliers De Constructions Mecaniques D'Escher Wyss & Company, for Regulating Device for Turbines.

Letters Patent of the Republic of Switzerland, No. 17,537, granted to Irene Schaad, Patent May 15th, 1899, Published July 15th, 1899.

Letters Patent of the United States, No. 688,801, granted February 26th, 1901, to Newton Lamb.

WHEREFORE, Defendant prays to be hence dismissed with its reasonable costs and disbursements in this behalf sustained.

CITY OF LOS ANGELES,
ALBERT LEE STEPHENS,

City Attorney.

By CHARLES S. BURNELL,

FREDERICK S. LYON,

Of Counsel for Defendant.

(Endorsements.)

[TITLE OF COURT AND CAUSE.]

IN EQUITY No. A-87.

Amended Answer of City of Los Angeles.

Now comes the above named defendant, City of Los Angeles, and by leave of Court first had and obtained, files this its Amended Answer to the Bill of Complaint in the above entitled cause, and for answer thereunto.—

I.

Denies that one Lamar Lyndon was the original, first, or sole inventor of the alleged or any new or useful Electromechanical Water-Wheel Governor, etc., not known or used by others before his invention or discovery thereof, or patented or described in any printed publication in the United States of America or any foreign country before his pretended invention or discovery thereof, or more than two years prior to his alleged application for Letters Patent thereon in the United States of America, or in public use or on sale in the United States of America for more than two years prior to his said pretended application for Letters Patent of the United States of America therefor; denies that on September 13th, 1900, or at any time whatsoever, said Lamar Lyndon made application in writing in due form of law to the Commissioner of Patents of the United States of America in accordance with the then existing law of the United States in such case made and provided, or complied in all or any respect with the conditions or requirements of said law; denies that after the alleged or any proceedings were had or taken in the matter of said pretended application, the alleged or pre-

tended Letters Patent of the United States alleged to be numbered 695,220, or any Letters Patent whatsoever, were on March 11th, 1902, or at any date whatsoever, granted or issued or delivered by the Government of the United States of America to said Lamar Lyndon; denies that by the said pretended Letters Patent the alleged or any sole or exclusive right, liberty, or privilege to make, use, or vend the said pretended invention in or throughout the United States of America, or the Territories thereof, or anywhere whatsoever, were granted or delivered to the said Lamar Lyndon, his heirs, legal representatives, or assigns, either for the full term of seventeen (17) years from and after said 11th day of March, 1902, or for any time or term whatsoever; denies that the said alleged inventions so alleged to be set forth, described, and claimed in and by said pretended Letters Patent are of great or any value whatsoever; denies that since the pretended grant or issuance of said pretended Letters Patent the said Electromechanical Water-Wheel Governor, etc., has gone into great or extensive or any use whatsoever; denies that the defendant has been, long prior to the commencement of this suit, or at any time, notified in writing of the grant or issuance of said Letters Patent, or of the alleged rights of the complainant or of complainant's assignor thereunder, or that the alleged or any demand has been made upon defendant to respect said pretended Letters Patent or not to infringe thereon; denies that this defendant has either prior or subsequent to the pretended notice or at any time whatsoever, made, or caused to be made, or has used, or has caused to be used Electromechanical

Water-Wheel Governors, etc., embodying or containing the said alleged invention, or has ever intended so to do; denies that the trade or public have generally or at all respected or acquiesced in the validity or scope of said Letters Patent, or in or to the alleged exclusive right or rights of your orator or of your orator's alleged assignor therein or thereunder; denies that by any act of this defendant the complainant has suffered any damage or injury in any sum whatsoever; denies that except for the alleged infringement thereon by this defendant, as alleged in said bill of complaint, and possibly by a limited number of other parties, as alleged in the bill of complaint, complainant and complainant's assignor have had or enjoyed the exclusive right, liberty, or privilege since March 11th, 1902, or since any other time or date, or during any time whatsoever, of manufacturing, selling, or using Electromechanical Water-Wheel Governor's etc., embodying or containing the alleged inventions alleged to be described, set forth, and claimed in and by said pretended Letters Patent.

II.

Denies that on July 7th, 1913, or at any other time, said Lamar Lyndon did sell, assign or transfer either by an instrument in writing or otherwise, or duly executed by him or delivered by him to complainant, all the exclusive or any right or title whatsoever in or to the right, title, and interest in or to said pretended inventions in Electromechanical Water-Wheel Governors, etc., or in or to or under said Letters Patent, or any or all rights of action, claims, or demands of whatsoever nature arising out of or accruing from any past infringement of said pretended Letters Patent.

III.

Denies that either with or without the license or consent of complainant or of complainant's alleged assignor or in violation of said Letters Patent or otherwise, or in violation of your orator's rights thereunder, this defendant has within the four years last past or at any time, either in the Southern District of California, Northern Division thereof, to-wit: in the County of Inyo, State of California, or at any place whatsoever, made or caused to be made, or has used, or is now using or making or causing to be made or to be used, any Electromechanical Water-Wheel Governors, etc., embodying or containing or embracing the pretended inventions described, claimed, or pretended to be patented in or by said pretended Letters Patent, or has any intention of so doing; denies that defendant has infringed upon the exclusive or any right or rights pretended to be secure to complainant by virtue of said pretended Letters Patent, or that any Electromechanical Water-Wheel Governor, etc., so made, caused to be made, or used by defendant is or are infringements upon or of said pretended Letters Patent, or contains in it or them the said pretended patented invention; denies that by any use whatsoever of said pretended invention defendant has realized large or any profits, gains or advantages whatsoever.

IV.

Further answering, upon information and belief defendant alleges that the alleged or pretended improvements or invention purporting or pretended to be patented in or by said pretended Letters Patent No. 695,220 or things in all substantial and material respects the

same as said alleged improvements or inventions had prior to the alleged or any invention or discovery thereof by the said Lamar Lyndon been patented or described in printed publications in the United States of America and in foreign countries, and particularly in and by the following Letters Patent, to-wit:

Letters Patent of France, No. 291,588, dated August 8th, 1899, granted to Societe Anonyme Des Ateliers De Constructions Mecaniques D'Escher Wyss & Company, for Regulating Device for Turbines.

Letters Patent of the Republic of Switzerland, No. 17,537, granted to Irene Schaad, Patented May 15th, 1899, Published July 15th, 1899.

Letters Patent of the United States, No. 668,801, granted February 26th, 1901, to Newton Lamb.

Letters Patent of the Republic of Switzerland, No. 17,536, granted to Irene Schaad, December 15th, 1898.

Letters Patent of the United States, No. 521,085, granted June 5, 1894, to C. S. English for ELECTRICAL GOVERNOR FOR WATER WHEELS.

Letters Patent of the United States, No. 519,597, granted May 8th, 1894, to E. P. Wetmore for ELECTRICAL WATER-WHEEL GOVERNOR.

V.

And defendant alleges that said Lamar Lyndon was not the original and first inventor or discoverer of any material and substantial part of the device alleged to be patented by the said pretended Letters Patent No. 695,220; and that said device had been in public use in this country for more than two years before the alleged application of said Lamar Lyndon for a patent therefor, and had been abandoned to the public; and that the de-

vise shown and described in said pretended Letters Patent No. 695,220 had been known and used by others in this country long prior to the pretended invention and discovery thereof by the said Lamar Lyndon, and particularly had been known and used by the Power Development Company, a corporation, organized under the laws of the State of California, at Bakersfield, California, during the years 1896 and 1897, and subsequently thereto; and had been known and used by Edward C. Cobb (whose address is Central Building, Los Angeles, California) at Bakersfield, California, during the years 1896 and 1897, and has been known by B. E. Van Emon (whose address is 235 First Street, San Francisco, California) since 1896 and 1897, and has been known by S. L. Berry (whose address is 317 Rialto Building, San Francisco, California) since 1896 and 1897, and was used by him at Bakersfield, California, during the years 1896 and 1897 and subsequently thereto.

VI.

And defendant alleges that the device of his said pretended Letters Patent, No. 695,220, had been described in various printed publications in this country prior to the alleged invention and discovery by the said Lamar Lyndon, and more than two years prior to his application for a patent therefor, and particularly had been described in the following printed publications:

Journal of Electricity published at San Francisco, California, in Volume 5, No. 1, page 15, under date of July, 1896, and under title "Electric Power at Bakersfield."

Journal of Electricity published at San Francisco, California, in Volume 4, No. 3, page 85, under date of

August, 1897, under the head "The Bakersfield Transmission."

Journal of Electricity published at San Francisco, California, Volume 4, No. 6, page 110, dated September, 1897, under head of "Water Wheel Government."

Engineering Magazine, November, 1897.

WHEREFORE, Defendant prays to be hence dismissed with its reasonable costs and disbursements in this behalf sustained.

CITY OF LOS ANGELES,

Albert Lee Stephens.

City Attorney.

By Charles S. Burnell,

Henry T. Hazard,

Of Counsel for Defendant.

Jospeh F. Westall,

Solicitors for Defendant.

(Endorsements.)

[TITLE OF COURT AND CAUSE.]

Decree.

This cause came on for final hearing on the 16th day of September, 1915, upon evidence hereinbefore taken before the Special Examiner appointed by the Court pursuant to stipulation heretofore filed herein, and was argued by counsel for the respective parties from time to time thereafter until and including the 5th day of November, 1915, when the Court, arguments of counsel being concluded, took time to consider; and the Court having considered, and now being fully advised in the premises, doth find the issues joined herein in favor of

the defendant; and it is, thereupon, ORDERED ADJUDGED AND DECREED, that the bill of complaint in this cause be, and the same is hereby dismissed for want of equity at the costs of said complainant.

Dated this 17th day of January, 1916.

(Signed) TRIPPETT,

O. K. As to form

Judge.

RAYMOND IVES BLAKESLEE,

Solicitor and of counsel for Complainant.

[TITLE OF COURT AND CAUSE.]

To Raymond Ives Blakeslee, Esq., attorney for plaintiff,
and Joseph F. Westall, Esq., attorney for defendant:

You are hereby notified that on April 13, A. D. 1914, at the hour of ten o'clock A. M., at the opening of court, or as soon thereafter as counsel can be heard, The Pelton Water Wheel Company, a corporation created under the laws of the State of California and having its principal place of business at the City and County of San Francisco in said State, will move the above entitled Court at the courtroom thereof at the City of Los Angeles, State of California, for leave to intervene in the above entitled suit and to be made a party defendant therein and be allowed to file an answer to the plaintiff's bill and to defend the said suit, and for such other and further relief as may appear proper to the Court.

The grounds of said motion will be that said The Pelton Water Wheel Company claims an interest in the said litigation and will be directly effected by the event thereof for the reasons appearing in its petition to intervene, which is herewith served upon you.

On the hearing of said motion the petitioner will use, read and refer to all the pleadings and papers on file in the said suit together with a petition for the right to intervene which is hereunto annexed and hereby referred to and made a part hereof.

Yours, etc.,

THE PELTON WATER WHEEL COMPANY.

by Miller & White,

Its Attorneys.

JOHN H. MILLER,

WM. K. WHITE,

Solicitors and Attorneys for Petitioner.

Dated, this 3rd day of April, 1914.

[TITLE OF COURT AND CAUSE.]

Petition by the Pelton Water Wheel Company for Leave to Intervene in the Above Entitled Suit.

Now comes The Pelton Water Wheel Company and petitions this Honorable Court for leave to intervene in the above entitled suit and to be joined as a party defendant therein for the purpose of defending the same and resisting the claims of the plaintiff, and in that behalf your petitioner alleges:

I.

That your petitioner is a corporation created and existing under the laws of the State of California and having its principal place of business at the City and County of San Francisco in the State of California.

II.

That the above entitled suit was begun on September 17th, 1913, by the filing on that day of a bill of complaint by George J. Henry, Jr., as plaintiff, against the City of Los Angeles, as defendant, wherein and whereby it was alleged that the said plaintiff was the owner and holder of certain letters patent of the United States for a device styled Electromechanical Water Wheel Governor, which said letters patent are numbered 695,220, and were issued by the Government of the United States on March 11, 1902, to one Lamar Lyndon, and thereafter duly assigned to the plaintiff on July 7, 1913, and that ever since said last named day plaintiff has been the sole owner and holder of the said letters patent and of all the rights and liberties granted thereby and of all claims and demands for infringement thereof theretofore accruing.

III.

That thereafter and in due season the City of Los Angeles appeared in said suit by its attorney and solicitor and filed an answer denying the validity of said letters patent and also denying infringement thereof by the City of Los Angeles.

IV.

That upon the issues so joined testimony has been taken on behalf of the plaintiff and his prima facie proofs are closed, and the defendant has been allowed until April 16, 1914, in which to offer its evidence in defense, but up to the present time no such evidence has been introduced.

V.

Your petitioner further alleges that the particular

machine or implement used by the defendant and claimed by the plaintiff to be an infringement of its said patent is a certain water-wheel governor with its attendant mechanism which was sold by the Abner Doble Company, a corporation, to the City of Los Angeles and installed and used by said City of Los Angeles in its system of water works for supplying water to its inhabitants.

VI.

That heretofore, to-wit, on January 12, 1912, the City of Los Angeles in its capacity as a municipal corporation entered into a contract with the Union Iron Works Company, a corporation created under the laws of the State of New Jersey and doing business in the City and County of San Francisco, in the State of California, whereby the said Union Iron Works Company covenanted in consideration of the sum of \$194,000.00 to furnish and deliver to the City of Los Angeles certain hydro-electric machinery for installation in and by the City of Los Angeles in its public water-works for supplying water to the inhabitants of Los Angeles, and in and by said contract said City of Los Angeles covenanted to pay to said Union Iron Works Company \$194,000.00 for said machinery.

VII.

That in and by said contract the Union Iron Works Company covenanted and agreed to save, keep harmless, and indemnify the City of Los Angeles from any and all claims of infringement that might be made against the City of Los Angeles by any person whatsoever from and by reason of the installation and use by the City of Los Angeles of the machinery called for by said contract, and, in case of any action or suit to enforce any

such claims, covenanted that the said Union Iron Works Company would defend said suit at its own cost and free of any cost or charge to the City of Los Angeles.

VIII.

That thereafter, to-wit, on February 17, 1912, said contract between the City of Los Angeles and the Union Iron Works Company was assigned by the Union Iron Works Company to your petitioner, which assignment was consented to by the City of Los Angeles, and thereupon your petitioner became substituted in the place and stead of the Union Iron Works Company and assumed all the obligations and duties provided for in said contract to be assumed and performed by the Union Iron Works Company, and the City of Los Angeles looks to your petitioner to perform and carry out all said obligations and duties.

IX.

And your petitioner further shows that in pursuance of said contract and said assignment, your petitioner has furnished and delivered to the City of Los Angeles practically all of the machinery called for and covered by the said contract and a part of the same has already been installed and put in place ready for use and the remainder thereof will be installed in the near future, and such installation will be completed as soon as practicable; that said City of Los Angeles has paid to your petitioner approximately one-half of the aforesaid purchase price and the remainder thereof is unpaid.

X.

That the machinery covered and called for by said contract and heretofore furnished by petitioner to the defendant, comprises three hydroelectric units of 14,000

horse power each, together with their attendant mechanism and appurtenances necessary to form a working plant, and your petitioner within ten days last past has been informed and believes and upon such information and belief alleges that the plaintiff, George J. Henry, Jr., during the giving of his deposition in this suit on his own behalf, as part of his *prima facie* proofs, contended and claimed that the said patent in suit was of a scope sufficiently broad to cover machinery, devices and mechanisms of the type of the said machinery, devices and mechanisms covered by said contract and so furnished by your petitioner to the City of Angeles under the terms thereof, and, therefore, plaintiff in effect is contending and maintaining in this suit that the use of said three hydro-electric units by the defendant City of Los Angeles will constitute an infringement of said letters patent, No. 695,220.

Your petitioner denies this contention and asserts that the aforesaid machinery, devices and mechanisms do not embody or contain any of the alleged inventions disclosed in or claimed by said letters patent and that the manufacture, sale or use thereof do not constitute an infringement of said letters patent or of any of the claims thereof. Your petitioner also alleges upon its information and belief that the aforesaid letters patent are invalid and of no effect whatever by reason of anticipation, prior use and want of invention, and your petitioner will, if allowed to intervene, offer evidence which will prove the invalidity of said letters patent.

XI.

Your petitioner further shows that it is directly interested in the event of this litigation and will be directly

affected by any decree entered therein, for the reason that if the validity of the said letters patent is sustained and the claims thereof be given the broad construction contended for by plaintiff, then the plaintiff will institute suit against your petitioner for alleged infringement of said letters patent, and your petitioner will be compelled to defend the same and will be put to detriment and disadvantage by reason of the prior adjudication of validity of said letters patent by this court in the above entitled suit.

XII.

And your petitioner further shows, as a reason why it is directly interested in the event of this litigation and should be allowed to intervene therein, that if said patent is sustained and given the scope contended for by plaintiff, as aforesaid, and an injunction granted against the City of Los Angeles, said injunction will be of a general character prohibiting the City of Los Angeles from using any device which may be an infringement of the said letters patent, and will, therefore, run against any such device as well as against the specific device involved in the suit and furnished by the Abner Doble Company, and will consequently prohibit the City of Los Angeles from using the machinery furnished by your petitioner to the City of Los Angeles as hereinabove stated, if the use of said type of machinery is so proved to be an infringement upon the said letters patent, and in such event your petitioner will be subjected to great and irreparable loss, injury and damage by being compelled to indemnify and save harmless the City of Los Angeles from such a decree against it.

For the foregoing reasons it is necessary to the interests of your petitioner that this suit be properly and vigorously defended in the first instance to the end either that the patent be declared invalid or that its claims be given such a limited and restricted construction as not to include your petitioner's said machinery so furnished to the City of Los Angeles.

XIII.

Your petitioner further shows that it is in a better position to defend the said suit than is the City of Los Angeles by reason of the fact that your petitioner has been engaged in this business for a great many years and has in its employ skilled mechanics and engineers of long experience who are thoroughly familiar with the state of the art and are better qualified than any other persons to show what said art is, and to discuss the character of the plaintiff's patent, and to explain it to the Court and to show that there is no infringement thereof by either the Abner Doble Machinery or your petitioner's said machinery.

XIV.

Your petitioner claims that it has a right to intervene and defend this suit by reason of its contract with the City of Los Angeles and to that end has requested the attorney of the defendant in said suit to allow it to join in the defense thereof with the City of Los Angeles by employing and paying therefor its own attorneys and producing as witnesses its skilled mechanics and engineers and other evidence in its possession, but the said attorney has declined and refused such request and will not permit your petitioner's attorneys to join in the defense of said suit or to have any control thereof or take

any part therein, and your petitioner fears that unless it is allowed to intervene all the grounds of defense to said suit will not be presented as fully and completely as they can be by your petitioner and that plaintiff therefore may obtain a decree in his favor to which he would not be entitled if all such defenses were proved, whereby your petitioner will be subjected to great and irreparable injury, loss and damage.

WHEREFORE, your petitioner prays that it may be allowed to intervene in said suit and be made a party defendant therein and be allowed to file an answer to the plaintiff's bill of complaint and to have full charge and control by its attorneys over the issues raised thereby and to fully defend the case in all respects and to such extent as if your petitioner had been originally named as defendant therein, hereby offering and agreeing to conduct such defense at its own cost and without any cost or expense to the City of Los Angeles.

THE PELTON WATER WHEEL CO.

By Edward L. Brayton,

JOHN H. MILLER,

President.

WM. K. WHITE,

Petitioner.

Solicitors and Counsel for Petitioner.

MILLER & WHITE,

Crocker Building, San Francisco, Cal.,

Attorneys for Petitioner.

STATE OF CALIFORNIA,

City and County of San Francisco.—ss.

EDWARD, L. BRAYTON, being first duly sworn, deposes and says that he is the president of The Pelton Water Wheel Company, petitioner, and that he has read the foregoing petition for leave to intervene and knows

the contents thereof; that the same is true to the best of his knowledge, information and belief.

EDWARD L. BRAYTON.

Subscribed and sworn to before me this 3rd day of April, 1914.

GENEVIEVE S. DINELUI,

Notary Public in and for the City and County of San Francisco, State of California.

(Endorsements.)

In the District Court of the United States for the Southern District of California, Southern Division.

GEORGE J. HENRY, JR.,

Plaintiff,

vs.

CITY OF LOS ANGELES,

Defendant,

and

THE PELTON WATER WHEEL COMPANY,

Intervenor.

IN EQUITY, No. A 87.

Amended Answer.

of the Pelton Water Wheel Company, Intervenor in the above entitled suit, to the bill of complaint of George J. Henry, Jr., plaintiff therein.

I.

Now comes the Pelton Water Wheel Company, Intervenor in the above entitled suit and by leave of Court first had and obtained files this its amended answer, and answering the bill of complaint of George J. Henry, Jr., plaintiff in said suit, denies, admits and alleges as follows:

1. That at all times hereinafter mentioned the intervenor was and is a corporation organized and existing under and by virtue of the laws of the State of California and having its principal place of business at the City and County of San Francisco, State of California, and answering paragraph —1— of said bill of complaint intervenor denies that prior to the 13th day of September, A. D. 1900, or at any other time, one Lamar Lyn-

don, mentioned in said paragraph —1—, was the original or first or sole or any inventor of the alleged new and useful electro-mechanical water wheel governor mentioned in said paragraph —1— or of any other device, or that the same was not known or used by others before his alleged invention or discovery thereof, or patented or described in any printed publication in the United States of America or any foreign country before the alleged invention or discovery thereof, or more than two years prior to his application for letters patent thereon in the United States of America, or in public use or on sale in the United States of America for more than two years prior to his said application for letters patent in the United States of America therefor, or not abandoned.

Answering paragraph II of the said bill of complaint, intervenor says that it is without knowledge as to whether or not the said Lamar Lyndon, being the original, first and sole inventor of said alleged electro-mechanical water wheel governor did on September 13, 1900, or on any other day make application in writing in due form of law to the Commissioner of Patents of the United States of America in accordance with the then existing laws of the United States in such cases made and provided or complied in all or any respects with the conditions and requirements of such law, and therefore the defendant leaves plaintiff to make such proof thereof as he may deem necessary and proper. Intervenor admits that on March 11, A. D. 1902, letters patent of the United States, No. 695,220, were granted, issued and delivered by the Government of the United States to the said Lamar Lyndon, but denies on information

and belief that by said letters patent there was granted or secured to him, or his heirs, legal representatives or assigns for the full term of seventeen years or for any term from and after said 11th day of March, 1902, or any other date, the sole or exclusive right, liberty, or privilege, or any right, liberty or privilege to make, use or vend the said alleged invention throughout the United States of America or the Territories thereof, and in this behalf intervenor avers that the said alleged letters patent are invalid and of no effect for the reasons hereinafter stated, and did not confer upon said Lyndon any right, liberty or privilege whatsoever.

And answering paragraph III of the said bill of complaint, intervenor denies that the alleged invention set forth, described, and claimed in and by said letters patent, No. 695,220, was or is of great or any value, or that since the grant and issuance of said letters patent or at any other time the same has gone into great or extensive use or any use. Denies that long prior to the commencement of this suit, but admits that a few days prior thereto, the defendant was notified in writing of the grant and issuance of the said letters patent, No. 695,220, and of the asserted and pretended rights of the plaintiff and his assignor thereunder and that a demand was then made upon defendant to respect the said letters patent and not to infringe thereon, but intervenor denies that notwithstanding such notice the defendant did continue or has continued to make or cause to be made or to use electro mechanical water wheel governors or other devices embodying the alleged invention; and in that behalf avers on information and belief that after receiving said notice the defendant caused an examination to be made of the

said letters patent and of the state of the art connected therewith and found and discovered therefrom that the said letters patent were void and of no effect for various and sundry reasons, and that defendant did not infringe thereon, and notified the plaintiff accordingly.

Answering paragraph IV of said bill of complaint, intervenor denies that the trade and public or either of them have generally or at all respected or acquiesced in the validity or scope of the said letters patent, No. 695,220, or in the alleged exclusive rights of the plaintiff or the plaintiff's assignor therein or thereunder, and denies that save and except for the alleged infringement thereof by defendant or possibly by a limited number of other parties plaintiff and his assignor have or either of them has had or enjoyed the exclusive right, liberty or privilege since March 11, 1902, of manufacturing, selling or using electro-mechanical water wheel governors embodying or containing the alleged invention described and claimed in said letters patent, No. 695,220, or that but for the alleged wrongful and infringing acts of the defendant or possibly a limited number of other parties plaintiff would now continue to enjoy said alleged exclusive rights or that the same are of great or incalculable or any benefit or advantage to plaintiff.

And answering paragraph V of said bill of complaint, intervenor says that it is without knowledge as to whether on July 7, 1913, or at any other time, said Lamar Lyndon by an instrument in writing duly or otherwise executed by him or delivered to the plaintiff, or otherwise, did sell or assign or transfer all or any of the alleged exclusive right, title or interest in and to said invention in electro mechanical water wheel governors, or in or to

or under said letters patent, No. 695,220, or including in any such assignment all or any rights of action, claims or demands of whatsoever or any kind or nature arising out of or accruing from any past infringement of said letters patent, or that said instrument in writing was recorded as required by the statutes or otherwise in the United States Patent Office on the 17th day of September, 1913, or at any other time on page 223 of Transfers of patents, Liber U 93 or elsewhere, and therefore intervenor leaves plaintiff to make such proof of said alleged facts as he may see fit and proper.

Answering paragraph VI of said bill of complaint, Intervenor denies that notwithstanding the premises, or well or otherwise knowing the same, or without the license or consent of plaintiff or plaintiff's assignor, or in violation of the said letters patent or plaintiff's alleged rights thereunder, or otherwise or at all, defendant herein, the City of Los Angeles, has within the four years last past prior to the commencement of the suit or at divers or at any times or at any other time in the Southern District of California, Northern Division, to-wit: in the County of Inyo, State of California, or elsewhere, made or caused to be made or used, or is now making or causing to be made or used, any electro mechanical water wheel governor or governors, or other devices, embodying or embracing the alleged invention described, claimed or patented in and by said letters patent, or has infringed upon the exclusive or any rights alleged to be secured to the plaintiff by virtue of said letters patent, or that any electro mechanical water wheel governor or other device made or caused to be made or used by the defendant was or is an infringement

upon said alleged letters patent, or that each or any of them contains in it the alleged patented invention or that although requested so to do or otherwise, defendant has refused or refuses to cease or desist from the alleged infringement, or ever was or is now making or causing to be made or used any electro mechanical water wheel governor or governors or other device containing or embracing the alleged patented invention or threatens to continue said alleged infringement unless restrained by this court, or has ever realized or is realizing large or any gains, profits or advantages, or that by reason of the premises or of any alleged acts of the defendant, plaintiff has suffered or is suffering great or irreparable or any injury or damage, or that for any alleged wrongs or injuries complained of plaintiff has no speedy or adequate remedy at law or is without remedy save in a court of equity where matters of this kind are properly relievable and cognizable.

II.

And for a further and separate defense and answer to said bill of complaint, intervenor avers that the said Lamar Lyndon was not the original or first inventor or discoverer of any material or substantial part of the thing patented and sought to be claimed and covered in and by the said letters patent, No. 695,220, dated March 11, 1902, but that long prior to the supposed invention or discovery thereof by the said Lamar Lyndon the same was and had been shown, indicated, described and patented in and by the following letters patent of the United States and foreign countries, copies of which letters patent and of each of them were printed and pub-

lished, as printed publications, prior to said Lamar Lyndon's alleged inventions or discovery of the alleged inventions alleged to be described in said letters patent, No. 695,220, to-wit:

UNITED STATES LETTERS PATENT.

No.	Date	Issued to
553,656	Feb. 5, 1895,	Nathaniel Lombard;
587,675	Aug. 3, 1897,	Nathaniel Lombard;
594,632	Nov. 30, 1897,	Nathaniel Lombard;
668,801,	Feb. 26, 1901,	Newton Lamb;
521,085,	June 5, 1894,	S. C. English;
519,597,	May 8, 1894,	E. P. Wetmore.

FRENCH LETTERS PATENT.

No. 291,588, issued August 8, 1899, by the Republic of France to Societe Anonyme des Ateliers de Constructions Mechaniques d'Escher Wyss & Company for Regulable By-Pass for Turbines.

SWISS LETTERS PATENT.

No. 7592, dated and issued on November 4, 1893, by the Swiss Federation to Geo. F. Ramel, of Zurich for "Turbine Inlet".

No. 17,536, dated December 15, 1898, registered on May 15th, 1899, and issued on July 15, 1899, by the Swiss Federation to Irene Schaad for "Device for Automatic Regulation of By-Pass on High Pressure Turbines".

GERMAN LETTERS PATENT.

No. 4,897, dated and issued on January 3, 1896, by the Kingdom of Norway to Frederich Hiorth of Kristiania on "Turbine with Regulating Device, enabling the driving water to circulate freely at all times."

GERMAN LETTER PATENT.

No. 100,353, dated and issued on February 12, 1896, by the Empire of Germany to Frederich W. L. Hiorth. Also No. 93,653, dated and issued on February 12, 1896, by the Empire of Germany to Frederich W. L. Hiorth.

No. 114,121, dated and issued on February 6, 1899, by the Empire of Germany to the Machine Works of Escher Wyss & Co. of Zurich, for "Positively Controlled by-pass for Turbines".

III.

And for a further and separate defense and answer to said bill of complaint, intervener avers that the said Lamar Lyndon was not the original or first or any inventor or discoverer of any material or substantial part of the thing or device sought to be claimed and covered in and by the said letters patent, No. 695,220, dated March 11, 1902, but that long prior to the supposed and alleged invention or discovery thereof by the said Lyndon, the same, and every material and substantial part thereof was fully described, disclosed, indicated and shown in each of the following printed publications, each of which was printed and published long prior to the said alleged invention or discovery by the said Lyndon, to-wit:

PRINTED PUBLICATIONS.

The issue of "Schweizerische Bauseitung", which was a weekly printed publication issued and published weekly during all the times hereinafter referred to in respect to the weekly issues thereof, which particular issue comprised No. 8 of Volume IX of said publication, and said No. 8 was printed and published at the City of Zurich,

Switzerland, on February 19, 1887, and particularly that portion of said issue No. 8 describing the Terni plant.

The issue of said "Schweizerische Bauzeitung" which issue was printed and published at said City of Zurich on July 27, 1895, and which issue comprised No. 4 of Volume XXVI of said publication and particularly that portion of said issue No. 4 describing the Davos Power Plant.

The issues of said "Schweizerische Bauzeitung" which were respectively printed and published at said City of Zurich in the year 1896, and which issues comprised Numbers 20, 21, 22, 23, 24, 25 and 26 of Volume XXVIII of said publication.

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on July 10, 1897, and which issue was numbered 8 of said publication and particularly that portion of said issue describing the Sihlwerke plant.

The issues of said "Schweizerische Bauzeitung" which were printed and published at said City of Zurich during the year 1897 and comprised Numbers 1 to 26 inclusive of Volume XXIX of said publication.

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on May 7, 1898, and particularly that portion of said issue describing the Gornergrat plant.

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on December 10, 1898, and particularly that portion of said issue describing the Arosa plant.

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on June

24, 1899, and which issue was Number 25 of Volume XXXIII of said publication, containing on pages 231 and 232 an article by Albert Hiorth entitled "Combined Turbine and By-pass Regulation System".

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on April 21, 1900, and particularly that portion of said issue describing the Bex plant.

The issue of said "Schweizerische Bauzeitung"* which was printed and published on November 14, 1896, and which issue was number 20 of Volume XXVIII of said publication, and particularly that portion of said issue describing Turbines and Governors at the Swiss National Exposition at Geneva.

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on November 21, 1896, and which issue was Number 2 of Volume XXVIII, and particularly that portion of said issue describing exhibits of Theodor Bell & Co. in Kriens at the Swiss National Exposition at Geneva.

The issue of said "Schweizerische Bauzeitung" which was printed and published at said City of Zurich on December 5, 1896, and which issue was Number 23 of Volume XXVIII and particularly that portion of said issue describing on page 162 the turbines and governors at the Swiss National Exposition in Geneva in 1896 and four high pressure turbines for Water Power Plants in Geneva and Chevres and a turbine for the completion of the plant at Davos.

Volumes I and II of Part Two of a printed publication entitled "Theory and Construction of the Turbines and

Water Wheels'' by G. Meissner, engineer, second edition revised by Engineer Nowak, President of the Technical School in Altenberg, forming the second part of the works entitled ''Hydraulics and the Hydraulic Motors'' which second and revised edition was printed and published by Herman Costenoble in October, 1895, in Jena, Germany, and particularly that portion of Volume II commencing on page 727 thereof describing an 180 horse power turbine plant in Tiefenstein, Baden, built by Theodor Bell & Co. of Kriens, Switzerland, and also in said Volume II the plate XXVI, and figures 4 and 5 thereof, illustrating said installation at Tiefenstein.

The issue of ''LeGenie Civil'', which was a publication printed and published weekly at the City of Paris, France, which particularly weekly issue thereof was printed and published at said City of Paris on November 18, 1899, and particularly the portion of said issue, commencing on page 45 and entitled ''Discharge Regulator for Turbines.''

The issue of the Journal of Electricity, which was a printed publication issued monthly during all the times hereinafter referred to in respect to the monthly issues thereof, which issue was printed and published at the City and County of San Francisco, U. S. A. in August 1896, and comprised No. 2 of Volume III of said publication and particularly that portion of said issue No. 2 commencing on page 28 thereof and entitled ''Water Wheel Regulation''.

The issue of said ''Journal of Electricity'' which issue comprised No. 5 of Volume IV of said publication and was printed and published at said City of San Fran-

cisco in August, 1897, and particularly that portion of said issue No. 5 commencing on page 85 and entitled "The Bakersfield Transmission".

The issue of said "Journal of Electricity" which issue comprised No. 6 of Volume IV of said publication and was printed and published at said City of San Francisco in September 1897, and particularly that portion of said issue No. 6, commencing on page 109 thereof and entitled "Water Wheel Government."

The issue of "Cassier's Magazine" which was a printed publication issued monthly, which issue was printed and published at the City of New York, U. S. A. in November, 1899, and comprised No. 1 of Volume XVII of said publication and particularly that portion of said No. 1, commencing on page 3 thereof and entitled "An 83 Mile Electric Power Transmission Plant" by James A. Lighthipe.

The issue of the "Electrical World and Engineer" which was a printed publication issued weekly, which issue was printed and published at the City of New York, U. S. A. on November 24, 1900, and particularly that portion of said issue commencing on page 799 and entitled "Electric Power on the Comstock Lode" by Wynn Meredith and Wyatt H. Allen.

IV.

Further answering intervenor alleges that prior to the alleged invention by said Lyndon of the devices and mechanisms described in and claimed by said Lyndon patent in suit and more than two years prior to the filing of the application for said patent, the said devices and mechanisms and substantially the same things described in and

claimed in said letters patent in suit and each of them had been and were in public use and were being publicly used by and were known to each of the following named parties at the following named places, to-wit:

Power Development Company (a corporation) at its hydro-electric plant on the Kern River near Bakersfield in Kern County, California.

Truckee River General Electric Co. (a corporation) at its plant near the town of Floriston in the State of California.

Mammoth Bar Mining Company at its plant on the American River near Auburn in the State of California.

Southern California Power Company at its plant, known as the Santa Ana River No. 1 plant, located near Crafton, California, on the Santa Ana River, and which plant is now controlled and owned by the Southern California Edison Company.

Further answering intervenor alleges that prior to the alleged invention by the said Lyndon of the devices and mechanisms described in and claimed in said Lyndon patent, in suit, and more than two years prior to the filing of the application for said Lyndon patent, devices and mechanism described in and claimed in said Lyndon patent in suit, and more than two years prior the said devices and mechanism and substantially the same things described in and claimed in said Lyndon patent had been and were on public sale and were being publicly sold at the Cities of Boston and Ashland, Massachusetts, and elsewhere in the United States by the Lombard Water Wheel Governor Company of Boston, Massachusetts, and of said City of Ashland.

V.

Further answering, defendant alleges that said Lamar Lyndon was not the original, or first inventor or discoverer of the alleged inventions, devices, or mechanism described in and claimed by said letters patent, No. 695,-220, or of any material or substantial part thereof, but that said alleged inventions and said devices and mechanisms and every material and substantial part thereof, long prior to the alleged invention thereof by the said Lyndon and more than two years prior to the filing of the application for said letters patent, were known to and publicly used by each of the following named persons whose respective places of residence are respectively set opposite their respective names and that such public use thereof by each of said hereinafter named persons was at the plant known at different times as the "Mammoth Bar Gold Mining Company" power plant and "Davis Gold Mining Company" power plant, and which power plant was at all said times and now is located in El Dorado County, California, on the Middle Fork of the American River, about six miles from Auburn, Placer County, California, and that said plant and said devices so used therein during said use thereof, were owned by W. F. Davis, deceased, who formerly resided at Auburn, California, and said plant and said devices, so used therein, are now owned by Ellen F. R. Davis, the widow of said W. F. Davis:

Mammoth Bar Gold Mining Co., Auburn, Placer Co., Cal.

Davis Gold Mining Co., Auburn, Placer Co., Cal.

W. F. Davis, Auburn, Placer Co., Cal.

Howard W. Davis, Auburn, Placer Co., Cal.

Fred S. Roumage, Auburn, Placer Co., Cal.

Burton C. Van Emon, San Francisco, Cal.

S. L. Berry, Sunnyvale, Santa Clare Co., Cal.

Ellen F. R. Davis, Auburn, Placer Co., Cal.

VI.

And for a further and separate defense, intervenor avers that for the purpose of deceiving the public the description and specifications filed by the patentee Lyndon in the Patent Office of the United States, upon which the said letters patent, No. 695,220, were issued, was made to contain less than the whole truth relative to the alleged invention and discovery and more than was necessary to produce the desired effect in that a device constructed in accordance with the said description and specification and the directions contained therein is and would be wholly inoperative and incapable of producing the desired effect or any useful effect whatever, and is and would be wholly worthless and of no utility whatever, and in that behalf the said patentee in and by his said specification has given a long, intricate and involved description of his alleged invention clothed in vague, shadowy and nebulous terms whereby the public would be induced to the conclusion that said patent involved some intricate, difficult and mysterious principle without knowing exactly and precisely what the same is, or how to avoid it during the life of the patent or to practice it after the expiration of the patent.

VII.

And for a separate and further defense, this intervenor alleges that the said Lamar Lyndon surreptitious-

ly and unjustly obtained the letters patent in suit, No. 695,220, dated March 11, 1902, for that which in fact was first invented and discovered by another, to-wit: Wynn Meredith, a resident of San Francisco, California, who at all times was using and exercising reasonable diligence in adapting and perfecting the same.

This intervenor further alleges that said Lamar Lyndon was not the original or first inventor or discoverer of any material or substantial part of the device patented in and by said letters patent No. 695,220, but on the contrary, said Lynn Meredith, who resides in the City of San Francisco, State of California, U. S. A., was the first and original inventor and discoverer of the said device and of every material part thereof, and the said Meredith, prior to Lyndon's alleged invention thereof reduced said invention to practice by embodying same in a hydro-electric plant which was, prior to Lyndon's said alleged invention, completed for and used by the Truckee River General Electric Co. near Floriston, California.

VII.

And for a separate and further defense, this intervenor alleges that the said Lamar Lyndon surreptitiously and unjustly obtained the letters patent in suit, No. 695,220 dated March 11, 1902, for that which in fact was first invented and discovered by another, to-wit: Nathaniel Lombard, a resident of Worcester, Massachusetts, U. S. A., who at all times was using and exercising reasonable diligence in adapting and perfecting the same.

This intervenor further alleges that said Lamar Lyndon was not the original or first inventor or discoverer

of any material or substantial part of the device patented in and by said letters patent, No. 695,220, but on the contrary, said Nathaniel Lombard, who resides in said City of Worcester, Massachusetts, U. S. A., was the first and original inventor and discoverer of the said device and of every material part thereof, and the said Lombard, prior to Lyndon's alleged invention thereof, reduced said invention to practice by embodying same in hydro-electric plant which was, prior to Lyndon's said alleged invention, completed for and used by the Honk Falls Power Company, at Ellenville, State of New York, U. S. A.

IX.

And for a separate and further defense, this intervenor alleges that the said Lamar Lyndon surreptitiously and unjustly obtained the letters patent in suit, No. 695,220, dated March 11, 1902, for that which in fact was first invented and discovered by another, to wit: Wyatt H. Allen, a resident of San Francisco, California, U. S. A., who at all times was using and exercising reasonable diligence in adapting and perfecting the same.

This Intervenor further alleges that said Lamar Lyndon was not the original or first inventor or discoverer of any material or substantial part of the device patented in and by said letters patent, No. 695,220, but on the contrary, said Wyatt H. Allen, who resides in San Francisco, California, U. S. A., was the first and original inventor and discoverer of the said device and of every material part thereof, and the said Allen, prior to Lyndon's alleged invention thereof reduced said invention to practice by embodying same in a hydro-electric plant

which was, prior to Lyndon's said alleged invention completed for the Truckee River General Electric Co., near Floriston, California.

X.

And for a separate and further defense, intervenor avers that the said alleged invention sought to be patented and claimed in and by said letters patent is of no utility whatever and that the same has never been put into practical use either by the patentee Lyndon or the plaintiff herein or by any other person, but that the said letters patent is purely a paper patent of no substantial value or utility and is now being used by the plaintiff for the purpose of harassing, worrying and annoying the defendant in its business operations and thereby endeavoring to compel the defendant to pay to the plaintiff a large sum of money in order to free itself from this litigation.

XI.

And for a separate and further defense, Intervenor avers that by reason of the state of the art existing at the time of the alleged invention of the patentee Lyndon, the device described and claimed and covered in and by said letters patent was not an invention and did not require or involve an exercise of the inventive faculty for its production, for which reason the said alleged letters patent are null, void and of no effect.

XII.

And for a separate and further defense this intervenor alleges that the said Lamar Lyndon surreptitiously and unjustly obtained the patent in suit, No. 695,220, dated March 11, 1902, for that which in fact

was invented by another, to-wit: Newton Lamb, of Yreka, Siskiyou County, California, who was using reasonable diligence in adapting and perfecting the same.

XIII.

And for a further and separate defense, this intervenor alleges that the said Lamar Lyndon was not the original or first inventor or discoverer of any material or substantial part of the thing patented in and by letters patent, No. 695,220, dated March 11, 1902, but on the contrary, one Newton Lamb of Yreka, Siskiyou County, California, was the first and original inventor and discoverer of the said device having invented and discovered the same prior to the supposed invention or discovery thereof by the said Lyndon, and after having invented and discovered the same, the said Newton Lamb on April 2, 1900, filed an application for a patent for said invention in the Patent Office of the United States, and after he had filed said application, the said Lamar Lyndon, on September 13, 1900, filed an application for letters patent of the United States for a patent on the same thing and by some means unknown to intervenor induced the officials of said Patent Office to issue to him the said patent, No. 695,220, on March 11, 1912, notwithstanding the fact that the said Lamar Lyndon was not the original and first inventor of the thing so patented.

WHEREFORE, intervenor prays judgment that the complaint be dismissed and costs awarded to the defendant and intervenor.

MILLER & WHITE.

J. H. MILLER and WM. K. WHITE,

Attorneys and Solicitors for Intervenor.

(Endorsements.)

*In the United States District Court, Southern District of
California, Southern Division.*

GEORGE J. HENRY, JR., Complainant,

vs.

THE CITY OF LOS ANGELES, Defendant.

IN EQUITY. No. A 87.

Petition for Order Allowing Appeal.

George J. Henry, Jr., complainant in the above-entitled cause, conceiving himself aggrieved by the final Order and Decree filed and entered on the 17th day of January, 1916, in pursuance of the decretal order of January 10, 1916, in the above-entitled cause, whereby it was ordered, adjudged and decreed that the bill of complaint in this cause be, and the same was thereby dismissed, for want of equity at the costs of the complainant,—now comes Raymond Ives Blakeslee, Esq., Solicitor for complainant, and petitions said Court for an order allowing the complainant, George J. Henry, Jr., to prosecute an appeal from said final Order and Decree and the decision of the Court thereupon, and from the whole thereof, to the Honorable The United

States Circuit Court of Appeals for the Ninth Circuit, for the reasons specified in the Assignment of Errors which is filed herewith, under and according to the laws of the United States in that behalf made and provided; and also that an order be made fixing the amount of security which complainant shall give and furnish upon such appeal; and that a citation issue as provided by law, and that a certified transcript of the records, proceedings and papers upon which said Decree was based be forthwith transmitted to the United States Circuit Court of Appeals for the Ninth Circuit, in accordance with the rules in equity promulgated by the Supreme Court of the United States and the statutes made and provided together with the exhibits on file in this case or duly certified copies thereof.

And your petitioner will ever pray.

(Signed) RAYMOND IVES BLAKESLEE,
Solicitor for Plaintiff.

[TITLE OF COURT AND CAUSE.]

Order Allowing Appeal.

In the above-entitled cause the complainant having filed his petition for order allowing an appeal from the order of this Court made and entered January 17, 1916, together with Assignment of Errors:

Now upon motion of Raymond Ives Blakeslee, Esq., Solicitor for complainant, it is ordered that said appeal be, and hereby is allowed to complainant, to the United States Circuit Court of Appeals for the Ninth Circuit, from the said order or decree made and entered by this

Court in this cause on January 17, 1916, that the bill of complaint in this cause be, and was thereby dismissed for want of equity at the costs of complainant; and that the amount of complainant's bond on said appeal be, and the same is hereby, fixed at the sum of two hundred fifty dollars (\$250.00).

IT IS FURTHER ORDERED, that upon the filing of such security a certified transcript of the records and proceedings herein be forthwith transmitted to said United States Circuit Court of Appeals for the Ninth Circuit, in accordance with the rules in equity by the Supreme Court of the United States promulgated, and in accordance with the statutes made and provided, together with the exhibits on file in this case or duly certified copies thereof.

Dated July 3rd, 1916.

(Signed)

TRIPPET,
Judge.

[TITLE OF COURT AND CAUSE.]

Assignment of Errors.

Comes now the complainant above named and specifies and assigns the following as the Errors upon which he will rely upon his appeal to United States Circuit Court of Appeals for the Ninth Circuit, from a decree or order of this Court of January 17, 1916:

I.

That the District Court of the United States for the Ninth Circuit, Southern District of California, Southern Division, erred in entering any decree in favor of defendant;

II.

That said Court erred in ordering and adjudging and decreeing that the bill of complaint in this cause be, and that the same was, thereby dismissed for want of equity, either with or without cost to defendant;

III.

That said Court erred in not finding and decreeing that the Letters Patent sued on are good and valid in law;

IV.

That said Court erred in not finding and decreeing that the Letters Patent sued on are infringed;

V.

That said Court erred in not finding and decreeing that Lamar Lyndon, the patentee of the Letters Patent sued on, was the original, true, first and sole inventor of the invention disclosed and claimed in and by the Letters Patent sued on;

VI.

That the Court erred in not finding and decreeing that the complainant George J. Henry, Jr., is and was at the time of commencement of this action in equity the sole owner of all the right, title and interest in, to and under said Letters Patent sued on, and in and to the invention in said Letters Patent sued on disclosed and described and claimed;

VII.

That said Court erred in not finding and decreeing that the Letters Patent sued on are not anticipated and therefore disclose and describe and claim an invention novel at the time Lamar Lyndon the patentee of the Letters Patent sued on applied for such Letters Patent sued on;

VIII.

That said Court erred in not finding and decreeing that the Letters Patent sued on are not anticipated and therefore disclose and describe and claim an invention novel at the time Lamar Lyndon the patentee of the Letters Patent sued on made the invention disclosed and described and claimed in said Letters Patent sued on;

IX.

That the Court erred in not finding the Letters Patent sued on to be for a pioneer invention or for an invention which introduced within the art of water-wheel governing revolutionary factors and agencies and means capable of practicable embodiment in either mechanical or hydraulic or electrical or other forms or any forms in part mechanical or in part hydraulic or in part electrical, and by which such sweepingly revolutionary factors the art of water-wheel governing, particularly in plants for the generation of electrical energy, was given a tremendous impetus and advance which conferred great benefits upon mankind;

X.

That the Court erred in not finding that the so-called Power Development Company of Bakersfield defense was an entirely abandoned and unsuccessful experiment;

XI.

That the Court erred in not finding that the so-called Power Development Company of Bakersfield defense, assuming it to have been in any sense complete or operative, failed to embody the invention disclosed and described and claimed in the Letters Patent sued on;

XII.

That the Court erred in not finding that each of the Letters Patent urged by defendant as anticipatory of the Letters Patent sued on or as showing the state of the art prior to the date of application of the Letters Patent sued on, either inclusive or exclusive of the French and Swiss patents which the Court ruled out of evidence as not properly proven or identified, was in effect a mere paper showing and did not disclose the invention disclosed and described and claimed in the Letters Patent sued on;

XIII.

That the Court erred in not holding that the Letters Patent sued on clearly and fully disclose and describe and claim an invention in every material respect practicable and operative;

XIV.

That the Court erred in holding that the invention claimed in the Letters Patent sued on is only for an electrical-mechanical water-wheel governor;

XV.

That the court erred in not finding that the Letters Patent sued on are infringed by the defendant's alleged infringing devices and mechanisms and apparatus located upon the line of the Los Angeles Aqueduct in the County of Inyo, California;

XVI.

That the Court erred in holding that the Letters Patent sued on are in effect a "paper patent" irrespective of its broad and comprehensive claims and its pioneer position in the art, and irrespective of the plain and clear

terms of the grant made by the Government of the United States pursuant to statute and in favor of the patentee of the Letters Patent sued on;

XVII.

That the Court erred in holding that the broad claims of the Letters Patent sued on must be limited in scope and meaning and comprehensiveness to any of the specific details of construction an inter-relation and operation of parts and features disclosed and described in the drawings and specification of the Letters Patent sued on, or to any strictly mechanical equivalents of the same;

XVIII.

That the Court erred in holding that the alleged infringing devices and mechanisms and apparatus of defendant are not in construction and inter-relation of parts and features clearly the mechanical equivalents of the corresponding parts and features described and disclosed in the Letters Patent sued on and within the broad language of the claims of the Letters Patent sued on and within a fair interpretation thereof and a fair consideration of the scope and importance and position in the art of the invention as claimed in the Letters Patent sued on;

XIX.

That the Court erred in holding that the licenses taken under the Letters Patent sued on do not carry much weight as to the utility of the invention;

XX.

That the Court erred in not holding that the licenses taken under the Letters Patent sued on reflect highly and tend to establish the utility and novelty and prac-

ticability and value of the invention disclosed and described and claimed in the Letters Patent sued on and the validity of such Letters Patent sued on;

XXI.

That the Court erred in holding that the patentee of the Letters Patent sued on, or his assignee the complainant George J. Henry, Jr., is chargeable in any respect with laches in connection with the Letters Patent issued to Lombard for the so-called automatic control feature of defendant's mechanism, or in connection with any proceeding which might have been taken with respect to this later invention or the Letters Patent therefor;

XXII.

That the Court erred in not finding that the specification of the Letters Patent sued on fully and clearly discloses an invention in water-wheel governing in broad and significant language and without limitation to specific embodiment of any kind whatsoever;

XXIII.

That the Court erred in not finding that the inverse relation between the water-wheel gate and the by-pass valve in the water-wheel governing mechanism as broadly claimed in the Letters Patent sued on, was in its broadest aspects of the pith of the invention of the Letters Patent sued on, within the meaning of the Paper Bag case, 210 U. S. 405;

XXIV.

That the Court erred in not applying the doctrine of the Paper Bag case, 210 U. S. 405, and of other cases relied upon by complainant, so as to find for complainant on the question of infringement;

XXV.

That the Court erred in holding in effect that infringement may be avoided by changing form without changing or departing from the real substance of the invention ;

XXVI.

That the Court erred in not finding that Lamar Lyndon, patentee of the Letters Patent sued on, diligently and as far as permitted within his means notified the infringers or threatening infringers of his Letters Patent and attempted to bring such infringers to terms and obtain recognition of the Letters Patent sued on and to obtain assistance in the manufacture of mechanism and apparatus embodying the invention of the Letters Patent sued on in one form or another ;

XXVII.

That the Court erred in not finding that the invention described and disclosed and claimed in the Letters Patent sued on went almost immediately into use in various forms, one of which forms was that installed by defendant as complained of herein ;

XXVIII

That the Court erred in holding that the defendant's device is wholly or in any manner unlike the conception of the Lyndon patent sued on as to the principle or operation and mechanical construction, and whether considered as a whole or when separated into elements ;

XXIX.

That the Court erred in holding that the defendant's device is very much like the machine called in the record the "Bakersfield Device," while holding that the "defendant's device has been highly successful from the

time of its installation, and since then has been actually producing the useful result claimed for the Lyndon patent," namely, the Letters Patent sued on;

XXX.

That the Court erred in holding that the doctrine of "paper patent" while pertaining to the anticipation of Letters Patent sued on, can be applied to Letters Patent themselves sued on so as to produce a voiding of the grant of the Letters Patent and in effect an arbitrary cancellation or limitation of the claims of the Letters Patent sued on and an avoidance and disregard of the fair meaning and terms of the claims of the Letters Patent sued on;

XXXI.

That the Court erred in holding that the failure of the Patent Office to declare an interference, assuming such could properly be declared, between the Lombard Patent for the automatic control in the defendant's device or the application thereof and the Letters Patent sued on or the application thereof, "amounts to a declaration of the patent office that the defendant's automatic control is not an equivalent of the automatic control of the Lyndon patent;"

XXXII.

That the Court erred in not finding that the frictionless type of by-pass valve might be read into the claims of the Letters Patent sued on or certain of the same, if desired, in order to find infringement;

XXXIII.

That the Court erred in not finding that the printed publication concerning the Bakersfield device, namely,

The Journal of Electricity, was merely the partial disclosure of a useless and abandoned experiment and therefore of no higher order of evidence than the thing purported to be described and disclosed in such article;

XXXIV.

That the Court erred in holding that "the Lyndon patent proposed to control the velocity of the wheel in both directions—that is to say, make it speed up and make it slow down, while the defendant's device primarily is intended only to take the pressure off the wheel, and thereby tend to make it slow down;"

XXXV.

That the Court erred in holding that the defendant's device cannot be an improvement upon the Letters Patent sued on for the reason that said Letters Patent fail specifically to claim a frictionless type of valve;

XXXVI.

That the Court erred in holding that the defendant's device was not manifestly a copy of the complainant's device while admitting substitution for features in the latter of features in the former, and in contending that the "whole conception of the alleged infringing device, and all its elements, are different," and that the machines "are intended to operate on a different principle;"

XXXVII.

That the Court erred in holding that the complainant has not sustained the claim of infringement;

XXXVIII.

That the Court erred in holding that complainant's device is the device specifically pictured and described in

the drawings of the Letters Patent sued on, and ignoring the multiplicity of forms possible within the broad claims of said Letters Patent.

In order that the foregoing Assignments of Error may be made of record, the complainant presents the same to the Court and petitions that disposition may be made thereof in accordance with the laws of the United States thereunto provided.

WHEREFORE, the said complainant prays that the said decree and order of this Court made and entered on January 17, 1916, that the bill of complaint in this cause be dismissed, and dismissing the same, for want of equity, at the costs of complainant, be reversed, in part and in whole, and that the United States District Court for the Southern District of California, Southern Division, be directed to enter an order setting aside in entirety the order and decree of January 17, 1916, and be directed to proceed to grant the relief and do equity as prayed for in the bill of complaint in this cause.

Respectfully submitted,

(Signed) RAYMOND IVES BLAKESLEE,
Solicitor and of Counsel for Complainant.

Conclusions of the Court.

This is a suit in which the complainant claims that the defendant is infringing a patent owned by the complainant, and granted to one Lamar Lyndon. The patent was granted for an Electromechanical Water-Wheel Governor. It will not be necessary for the Court to describe fully this patent, or the claims made in it. The purposes which were sought to be accomplished by the invention are described in a general way in the first para-

graph of the specifications, as follows:

“The governors at present employed to regulate the water-supply to the water-wheel in general simply operate to open or close the water-wheel gate, thereby allowing of the admission of a greater or less supply of water. Now, the first effect of such opening or closing of the gate, owing to the inertia of the water, is always the opposite to that which it is desired to bring about—i. e. the opening of the gate operating to momentarily cause less velocity of water at the wheel, owing to the greater orifice the water has to flow through, and, vice versa, the closing of the gate operating to momentarily cause an increase of velocity, owing to the contraction of the orifice. Moreover, these contrary effects will last until the changed conditions can be imparted to the source of supply of water.”

Complainant contends that the evidence shows that the defendant is infringing the complainant's patent and that it is not necessary to resort to the doctrine of equivalents in order to determine this infringement. The complainant contends that the Lyndon patent in controversy is a primary and pioneer patent; that it is so broad in scope and entitled to such broad interpretation that the claims therein may be read upon the structures of the defendant so as to show infringement regardless of the doctrine of equivalents. The broadest claim in the Lyndon patent is as follows:

“6. In a water-wheel governor, the combination with means for operating the water-gate in either direction, a by-pass for the water-wheel, and a valve

controlling said by-pass, of means connected to the water-gate-operating means and operating the by-pass valve inversely to the operation of the water-gate.”

The complainant urges that this claim covers any mechanical means connected with the water-gate-operating means, and operating the by-pass valve inversely to the operation of the water-gate. He contends that the word means is so broad in its scope that it embraces any mechanism that will accomplish the result claimed for his patent. In support of this contention complainant cites the Paper Bag case, 210 U. S. 405; Reis et al. vs. Barth Manufacturing Company, 136 Fed. 850; Arnold vs. Tyden, 193 Fed. 410; Davis Sewing Machine Company vs. New Departure Manufacturing Company, 217 Fed. 775.

In order to understand the Paper Bag case as it is claimed to apply to the question before the court, we will quote a few sentences from it:

“It may be well before considering these contentions to refer again to the view which the Circuit Court and the Circuit Court of Appeals had of Liddell’s patent. The Circuit Court said that the “pith” of the invention “is the combination of the rotary cylinder with means for operating the forming place in connection therewith, limited, however, to means which cause the place to oscillate about its rear edge on the surface thereof,” and distinguished the invention from the prior art, as follows:

“Aside from the cylinder and the forming plate oscillating about its rear edge everything in these claims (the claims of the patent) is necessarily old in the arts.” It

was this peculiar feature of novelty, it was said, which clearly distinguished it from all that went before it. This conclusion was in effect affirmed by the Circuit Court of Appeals. * * * * The Court, as we have seen concluded from the character of the Liddell patent, that "the second method", that is, the method of the Continental Company's machine, was "*within the doctrine of equivalents.*"

Counsel, however, contends that the Circuit Court, in its decision, virtually gave Liddell a patent for a function by holding that he was entitled to every means to *cause the forming plate to oscillate about its rear edge.*

The distinction between a practically operative mechanism and its function is said to be difficult to define. Robinson on Patents, Sec. 144, et. seq. It becomes more difficult when a definition is attempted of a function of an element of a combination which are the means by which other elements are connected and by which they coact and make complete and efficient the invention. But abstractions need not engage us. *The claim is not for a function, but for mechanical means to bring into working relation the folding plate and the cylinder. This relation is the very essence of the invention, and marks the advance upon the prior art. It is the thing that never had been done before, and both the lower courts found that the machines of the Continental Company were infringements of it. It is not possible to say that the findings of those courts on that fact or on the fact of invention were clearly wrong, notwithstanding the great ability of the argument submitted against them.*"

It is plain to be seen from the quotation made and a

careful reading of the Paper Bag case, that that case is decided upon the doctrine of equivalents. The Court gave to the invention a broad interpretation in that regard. All the subsequent cases relied upon are based upon that case, and none of the cases hold what is contended for by complainant. The true interpretation of the word "means" used in the patent is found in the case of *Arnold vs. Tyden*, *supra*, wherein the Court says:

"Since the decision referred to, the Supreme Court, in the Paper Bag case, 210 U. S. 405, 28 Sup. Ct. 748, 52 L. Ed. 1122, has considered the question of functional claims, and held that claims for means are valid *where the specifications clearly disclose the particular means or mechanism having the function indicated in the claims.*"

From these decisions it is plain that in construing the word "means" in the patent, there are two effects to be given to it. When the word is used simply to describe connecting parts that bring into working relation the real elements of the machine, the word should have the broadest significance in the application of the doctrine of equivalents; but where the word is used to describe the real working elements of the patent, it must be limited to the disclosures in the patent and to such equivalents thereof as are justified by the relation which the invention bears to the state of the art. If the word means in the patent is designed to have a greater significance than the disclosures in the patent—that is to say, the specific device disclosed and the equivalents thereof—then the patent would be for a function. The only way to uphold the use of the word means in a patent is to con-

strue it as above stated. Any other construction would make the patent void.

In determining what an equivalent is we must look at the machines, or their several devices or elements, in the light of what they do, or what office or function they perform and how they perform it. It is not safe to give much heed to the fact that the corresponding devices in two machines organized to accomplish the same result, are different in shape or form the one from the other, as it is necessary in every such investigation to look at the mode of operation or the way the devices work, and at the result as well as the means by which the result is attained. We should pay special attention to such portions of the device as really do the work so as not to give undue importance to other parts of the same which are only used as a convenient mode of constructing the entire device.

In this regard it is appropriate to take a general view of the situation and determine the positions occupied by the invention and the alleged infringing device, in the state of the art.

The statute requires that every patent shall contain a short title or description of the invention or discovery correctly indicating its nature and design. Lyndon, in complying with this statute, named his patent "Electro-mechanical Water-Wheel Governor."

The application for this patent was filed September 30, 1900, and it was granted March 11, 1902. In a brief for complainant it is said:

"Lyndon approached many companies manufacturing governors in the attempt to get them to manufacture un-

der his patent, or recognize it, covering a period from nearly four years prior to the grant of the patent up to shortly before the time negotiations commenced with complainant to buy the patent.”

These negotiations were shortly before the commencement of this suit.

The evidence supports this claim of complainant. Probably the best evidence that a device is for a new and useful invention is that it goes into instant and general use. The fact that a device does not go into instant and general use is, at least, some evidence that it is not a new and useful invention. There never has been a machine manufactured like that described in this patent. No machine has ever been manufactured under and in pursuance of it. No license was ever issued for any machine to operate under it prior to the commencement of this suit. Since the commencement of this suit licenses have been issued under the patent, but these licenses were issued under such circumstances that they do not carry much weight as to the utility of the invention. The defendant has attacked the patent by expert testimony, and the witnesses testified that the alleged invention of Lyndon is not a practical machine and will not work. The evidence shows, unquestionably, that the Lyndon invention will not work if the mercury cups are used as disclosed in the patent without change.

The defendant's device was installed early in the year of 1909. It is wholly unlike the conception in the Lyndon patent as to the principle of operation and mechanical construction, and this is true whether considered as a whole, or when separated into elements. It is very much

like the machine called in the record the "Bakersfield device." This Bakersfield device was described in a printed publication, namely,—The Journal of Electricity, in September, 1897. The defendant's device has been highly successful from the time of its installation, and since then has been actually producing the useful result claimed for the Lyndon patent.

In a brief filed on behalf of complainant, it is argued as follows:

"* * * we wish to show to the court a little more particularly that the other prior patents set up, namely, English, Wetmore, Escher-Wyss and Schaad, were not shown ever to have been put, as to their subject matter, into practical operation or effect, and are, therefore, what is known in patent law as mere "paper patents."

The brief in argument states that "such patents reflect nothing more than academic attempts to do something which, as far as the record shows, never was done."

* * * "It was held in a leading case in this very circuit, by the Circuit Court of Appeals, in an opinion filed October 3, 1910, namely, in Kings County Raisin & Fruit Co. et al. v. United States Consolidated Seeded Raisin Co., 182 Fed. 59, that a patent for the first successful machine to accomplish a new and useful result is not anticipated or limited by a mere paper patent granted years before, although it discloses a theoretically successful machine, such a patent having no place in the prior art." The brief then quotes from the decision the following:

"The Crosby invention undoubtedly anticipates and describes the whole theory of the Pettit patent; but it does not appear ever to have been put to use, and there

is no evidence that any machine was ever constructed under it. It is one thing to invent the theory of a machine; it is quite another thing to invent a successfully operating machine. * * * It is probably unnecessary in this appeal to determine just what effect should be given to the Crosby patent as limiting the scope of the patented invention. It would seem that it was one of those unsuccessful or abandoned inventions which are held to have no place in the art to which they relate. In an analogous case Mr. Justice Brown said: “ ‘His efforts in that direction must be relegated to the class of unsuccessful and abandoned experiments which, as we have repeatedly held, do not affect the validity of a subsequent patent.’ ” *Deering v. Winona Harvester Works*, 155 U. S. 286, 15 Sup. Ct. 118-124, 39 L. Ed. 153.

“In any view, the Pettit being the first successful machine to accomplish a new result, the claims of the patent are clearly entitled to a broad and liberal construction and to the benefit of the doctrine of equivalence.”

The argument thus made by complainant concerning the patents in the prior art, applies to the foregoing facts concerning the patent in suit and defendant's device, notwithstanding that defendant's machine has never been patented. The defendant has a successful machine; complainant has a patent or an idea or theory. Under such circumstances complainant is not entitled to that liberal application of the rule of equivalents that a patent is entitled to where the invention was the first to produce a new and useful result.

Shortly after the issuance of the Lyndon patent, a patent was issued upon what, in the argument, was called

the automatic control in use by the defendant. This patent upon this automatic control was issued on the 18th day of March, 1902. The issuance of this patent, of course, would not prevent the claim of infringement, but it amounts to a declaration of the patent office that the defendant's automatic control is not an equivalent of the automatic control in the Lyndon patent, and some weight should be given to this interpretation of the patent office. No suit has ever been prosecuted by Lyndon or his successor, except in this one, to have it adjudicated that this patent was an interfering patent or an infringement of the complainant's patent, nor has there been any notification given of his claim. The defendant in this case had a right to assume, by reason of the laches of Lyndon in this regard, that this automatic device was not an equivalent. Aside, however, from these reasons against this automatic device being recognized as an infringement of complainant's patent, I am clearly of the opinion that the two devices are not equivalents.

The complainant argues that the Lyndon patent covers a frictionless type of valve in the by-pass, and asserts that the defendant is infringing that feature of the patent. The Lyndon patent, in the drawing, shows what is known as a "butterfly valve", and in one place in the description of the patent the name "butterfly valve" is used, but nowhere in the claims is there any reference to "butterfly valve" or to a frictionless type of valve. In claims 8 and 9 of the patent a claim is made for "a valve for such by-pass normally held in partly opened position." This is the only claim in the patent concerning the valve. Any

valve may be held in partly opened position, and such position may be the normal position of the valve in the mechanism. In regard to the valve, there is nothing in the description or claims to the effect that any particular kind of valve ought to be used, or that it would be better to use any particular kind of valve. The defendant does not use a butterfly valve but uses a needle valve in the by-pass, and this needle valve works upon a different principle from the operation of the butterfly valve in the Lyndon patent in this—the butterfly valve is held in partly opened position so that the water will continually flow past it out of the by-pass, while the defendant's by-pass is normally closed, the needle valve sitting firmly on its seat and only removed to let the water out when necessary to relieve the pressure of the water from the main nozzle upon the water wheel. The butterfly valve in the patent, it is said in the description, would be normally half-way open so that the amount of water flowing through the by-pass and around the wheel without doing work would be one-half the amount which the by-pass is capable of carrying. The principle upon which the defendant's device is worked is that no water goes out of the by-pass except to relieve the pressure upon the wheel. The Lyndon patent proposes to relieve the pressure to control the velocity of the wheel in both directions,—that is to say, make it speed up and make it slow down, while the defendant's device primarily is intended only to take the pressure off the wheel, and thereby make it tend to slow down. The defendant's device saves water, while the Lyndon patent continually wastes water. It is argued that the defendant's device, in this regard, is only

an improvement upon the Lyndon patent, and this might be well urged if the Lyndon patent claimed a frictionless type of valve.

If the defendant's device was manifestly a copy of the complainant's machine with the exception that the defendant had substituted a dashpot for a solenoid, or a dashpot for a reversible clutch gear, or a needle valve in the by-pass for a butterfly valve, in order to avoid infringement, the Court might well look with more favor on the claim that such elements should be regarded as equivalents. But where it is manifest that the whole conception of the alleged infringing device, and all its elements, are different, and where the machines are intended to operate on a different principle, the Court could not decide such things to be equivalents without doing violence to the rule of law on the subject.

The complainant has not sustained the claim of infringement. There are other questions of interest in the case, but it is unnecessary for the Court to notice them. The defendant will prepare a decree dismissing the bill, and submit the same to the complainant.

OSCAR A. TRIPPET,

Judge.

January 10, 1916.

(Endorsements.)

[TITLE OF COURT AND CAUSE.]

Citation

UNITED STATES OF AMERICA—SS.

To City of Los Angeles, Greeting:

You are hereby cited and admonished to be and appear

at a United States Circuit Court of Appeals for the Ninth Circuit, to be held at the City of San Francisco, in the State of California, on the 5th day of August, A. D. 1916, pursuant to an order allowing an appeal, entered in the Clerk's office of the District Court of the United States, of the Ninth Judicial Circuit, in and for the Southern District of California, Southern Division, in that certain suit in equity, No. A-87, wherein you are defendant and appellee, and George J. Henry, Jr., is the complainant and appellant, to show cause, if any there be, why the order or decree of said Court made and entered January 17, 1916, against said appellant, in the said order allowing appeal mentioned, should not be corrected and speedy justice should not be done to the parties in that behalf.

WITNESS, the Hon. Oscar A. Trippet, United States District Judge for the Southern District of California, of the Ninth Judicial Circuit, this 17th day of July, 1916.

(Signed) OSCAR A. TRIPPET,

United States District Judge for the
Southern District of California.

Due service and receipt of a copy of the within citation is hereby admitted this 15th day of July, 1916.

(Signed) JOSEPH F. WESTALL,

Solicitor and of Counsel for Defendant.

(Signed) ALBERT LEE STEVENS,

Solicitor and of Counsel for Defendant.

[TITLE OF COURT AND CAUSE.]

Bond on Appeal.

Know All Men by These Presents:

That Maryland Casualty Company, a corporation organized and existing under the laws of the State of Maryland, and duly licensed to transact business in the State of California, is held and firmly bound unto City of Los Angeles, defendant in the above-entitled suit, in the penal sum of two hundred fifty dollars (\$250.00), to be paid to the said City of Los Angeles, its successors or assigns, which payment well and truly to be made the Maryland Casualty Company binds itself, its successors and assigns, firmly by these presents.

Sealed with the corporate seal and dated this 10th day of July, 1916.

The condition of this obligation is such that whereas the said complainant, George J. Henry, Jr., of the above-entitled suit, is about to take an appeal to the United States Circuit Court of Appeals for the Ninth Circuit, to reverse an order or decree made, rendered and entered on the 17th day of January, 1916, by the District Court of the United States, for the Southern District of California, Southern Division, in the above-entitled cause by which the bill of complaint in the above-entitled cause was ordered, adjudged and decreed to be, and was thereby dismissed for want of equity at the costs of said complainant:

Now, therefore, the condition of the above obligation is such that if said George J. Henry, Jr., shall prosecute his said appeal to effect and answer all damages and costs, if he shall fail to make good his appeal, then this oblig-

tion shall be void; otherwise to remain in full force and effect.

In witness whereof, the seal and signature of said principal is hereunto affixed and the corporate name of said surety is hereto affixed and attested by its duly authorized attorneys-in-fact, at San Francisco, California, this 10th day of July, 1916.

(Signed) GEORGE J. HENRY, JR.

(Signed) MARYLAND CASUALTY COMPANY,
By (Signed) ARTHUR H. CONNOLLY,

Attorney-in-Fact.

(Signed) CHAS. A. QUITZAN, (Seal)

Attorney-in-Fact.

(Seal)

State of California,

County of San Francisco.—ss.

On this 10th day of July, 1916, before me, M. V. Colling, a Notary Public in and for said County of San Francisco, State of California, residing therein, duly commissioned and sworn, personally appeared Arthur H. Connolly, known to me to be the attorney-in-fact, and Chas. A. Quitzan, known to me to be the attorney-in-fact of the Maryland Casualty Company, the corporation that executed the within instrument, and acknowledged to me that said corporation executed the same; and that the signatures to said instrument of said attorneys-in-fact are the genuine signatures, respectively, of said Arthur H. Connolly, its attorney-in-fact, and said Chas. A. Quitzan, its attorney-in-fact.

?

(Signed) M. V. COLLING,

Notary Public in and for the County of
San Francisco, State of California.

[TITLE OF COURT AND CAUSE.]

Precipe Under Rule 75.

To the Clerk of the Court:

You will please incorporate into the transcript on appeal from this Court to the Circuit Court of Appeals, on order allowing appeal on behalf of defendant, made and entered the 3rd day of July, 1916, the following portions of the record of this cause in equity, to-wit:

The Testimony and Record and Proceedings in connection therewith taken and had in this cause, in narrative and condensed form, as filed herewith;

The Bill of Complaint herein;

The Answer, the Amended Answer and the Amendments to the Answer of the defendant herein;

The Petition of the Pelton Water Wheel Company for Leave to Intervene and be made a defendant, and the papers and affidavits thereon;

A certified copy of the Minute Order permitting such intervention of the Pelton Water Wheel Company and making it a defendant herein and permitting it to file an answer herein;

The Answer of the Pelton Water Wheel Company herein, the Amended Answer of the Pelton Water Wheel Company herein and the Amendments to the Answer of the Pelton Water Wheel Company herein;

The Assignment of Errors filed herein;

The Petition for Order allowing appeal herein;

The Order allowing Appeal herein;

The Citation on Appeal herein;

The names and addresses of the solicitors and counsel

for the parties herein, including the defendant and intervenor the Pelton Water Wheel Company;

The Stipulation between the Complainant and the Pelton Water Wheel Company, Intervenor and Defendant herein, that the answer of the said Pelton Water Wheel Company be stricken out and said intervenor and defendant be excluded as a party from this cause;

Certified copy of the Minute Order approving such stipulation between complainant and the Pelton Water Wheel Company;

Subpoena ad Respondendum;

All of the original Exhibits herein;

Bond on Appeal;

This Precipe;

The Opinion of the District Judge on file herein;

The Court Order of July 17, 1916, as to withdrawal of all exhibits; and

The Decree herein.

Very Respectfully,

(Signed) RAYMOND IVES BLAKESLEE,
Solicitor and Counsel for Com-
plainant-Appellant.

[TITLE OF COURT AND CAUSE.]

***Order for Transmission of Exhibits to
United State Circuit Court of Appeals
for the Ninth Circuit.***

It appearing that complainant-appellant in this cause has requested such action, and good cause appearing therefor,

It is ordered that all of the original exhibits forming

part of the evidence in this cause, being because of their nature necessary to inspection by the United States Circuit Court of Appeals for the Ninth Circuit, and by the Supreme Court of the United States, if said cause is appealed thereto, may be sent up as original exhibits instead of making copies or duplicates thereof, in addition to the transcript of the record, in accordance with Subdivision 4 of Rule 14 of the Rules of the United States Circuit Court of Appeals, for the Ninth Circuit, and subdivision 4 of Rule 8 of the Rules of the Supreme Court of the United States; the said exhibits to be delivered to the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, to be returned to the files of the cause in this Court, upon the final determination of the appeal herein by the United States Circuit Court of Appeals for the Ninth Circuit or by the Supreme Court of the United States, if appealed thereto.

(Signed) TRIPPET,

Judge.

Dated Los Angeles, California, July 17, 1916.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to October 1, 1916, to
File Record.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed said appellant to docket said cause and file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is

hereby enlarged and extended to and including the 1st day of October, 1916.

Dated at Los Angeles, July 27, 1916.

U. S. District Judge, Southern District
of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to January 1, 1917,
to File Record.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the 1st day of January, 1917.

Dated at Los Angeles, California, September 23, 1916.

(Signed) TRIPPET,

U. S. District Judge, Southern District
of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to February 1, 1917,
to File Record.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court

of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the first day of February, 1917.

Dated at Los Angeles, California, December 15, 1916.

(Signed) JUDGE TRIPPET,

U. S. District Judge, Southern District
of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to April 1, 1917, to
File Record.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the first day of April, 1917.

Dated at Los Angeles, Cal., January 24, 1917.

(Signed) JUDGE TRIPPET,

U. S. District Judge, Southern District
of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to June 1, 1917, to
File Record.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed

said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the 1st day of June, 1917.

Dated at Los Angeles, Cal., March 26, 1917.

(Signed) TRIPPET,

U. S. District Judge, Southern District
of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to September 1, 1917,
to File Record, Etc.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the 1st day of September, 1917.

Dated at Los Angeles, Cal., May, 1917.

(Signed) TRIPPET,

U. S. District Judge Southern District
of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to January 1, 1918,
to File Record.***

Good cause appearing therefor,

It is hereby ordered, that the time heretofore allowed

said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the first day of January, 1918.

Dated at Los Angeles, Cal.,

August 30th, 1917.

(Signed) TRIPPET,
U. S. District Judge, Southern
District of California.

[TITLE OF COURT AND CAUSE.]

***Order Extending Time to January 10, 1918,
to File Record, Etc.***

Good cause appearing therefor,

It is hereby ordered, (the parties hereto having so stipulated subject to approval of the District Court), that the time heretofore allowed said appellant to docket said cause and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, be and the same is hereby enlarged and extended to and including the 10th day of January, 1918.

Dated at Los Angeles, Cal., December 19, 1917.

(Signed) TRIPPET,
U. S. District Judge Southern District
of California.

[TITLE OF COURT AND CAUSE.]

Stipulation.

Subject to the approval of the Court, whose approval

is hereby requested, the parties to the above-entitled suit, by their respective solicitors and counsel, stipulate and agree, as follows:

I.

To save cost and expense, facilitate said appeal and present the issues as presented in this Court, it is stipulated and agreed that the Transcript of Record on Appeal in the above entitled suit shall consist of a true and correct copy of each of the following papers, to-wit:

(a) A true and correct copy of all proofs and depositions and proceedings thereon taken and had on behalf of the respective parties out of Court, the same to be verbatim as appearing in the records of the respective notaries or special examiner certifying and returning the same, including a copy of each and all exhibits except model and physical exhibits, and excepting the following portions: the depositions of Alexander, Hewitt, Hance, Handley, Del Valle, Daehler, Dodd, McKay, Fessenden, Strong, Spangler, Gardiner, and Stebbins;

(b) The bill of complaint herein;

(c) The answer, the amended answer and the amendments to the answer of the defendant herein;

(d) The petition of the Pelton Water Wheel Company for leave to intervene and he made a defendant, and the papers and affidavit thereon;

(e) The minute order permitting such intervention of the Pelton Water Wheel Company and making it a defendant herein and permitting it to file an answer herein;

(f) The amended answer of the Pelton Water Wheel Company herein;

- (g) The assignment of errors filed herein;
- (h) The petition for order allowing appeal herein;
- (i) The order allowing appeal herein;
- (j) The citation on appeal herein;
- (k) The several orders extending time to docket appeal and file record thereof in the Appellate Court;
- (l) The bond on appeal herein;
- (m) The praecipe herein;
- (n) The opinion of the District Judge on file herein;
- (o) The decree herein;
- (p) The stipulation between the complainant and the Pelton Water Wheel Company, intervenor and defendant herein, that the answer of the said Pelton Water-Wheel Company be stricken out and said intervenor and defendant be excluded as a party from this cause;
- (q) The minute order approving such stipulation between complainant and the Pelton Water Wheel Company;
- (r) The Court order of July 17, 1916, as to withdrawal of all exhibits.

II.

It is further stipulated and agreed that in preparing the said Transcript of Record on Appeal, there may be omitted the notations of adjournment and meetings, captions, headings, and the like, with the exception of the dates of sessions of taking testimony and of proceedings on the record, and the parts of days upon which such sessions were held.

III.

It is further stipulated and agreed that an order be entered permitting complainant to withdraw all paper

exhibits upon giving the Clerk of this Court an identifying receipt therefor, complainant hereby stipulating and agreeing to return each and all said paper exhibits to the Clerk of this Court immediately after use of the same solely for the purpose of producing copies thereof for said Transcript of Record on Appeal.

IV.

It is further stipulated and agreed that an order be entered enlarging and extending to and including the tenth day of January, 1918, the time heretofore allowed complainant (appellant) to docket this cause on appeal and to file the record thereof, with the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit.

V.

It is further stipulated and agreed that the defendant (appellee) herein, is the owner of and operates, and at all times as to which mention is made thereof in this case has owned and operated, the hydro-electrical power plants and the water wheel governing apparatus thereof mentioned in the record of this case and charged to infringe the patent in suit and situated in the County of Inyo, California.

Dated Los Angeles, Cal., December 14, 1917.

(Signed) RAYMOND IVES BLAKESLEE,
Solicitor for Complainant.

(Signed) ALBERT LEE STEPHENS,
City Attorney.

(Signed) FREDERICK S. LYON,
Special Counsel, Solicitors for Defendant.

The within stipulation is hereby approved, and it is ordered accordingly.

(Signed) TRIPPET,
District Judge.

[TITLE OF COURT AND CAUSE.]

Stipulation.

Subject to the approval of the Court, whose approval is hereby requested, the parties to the above-entitled suit, by their respective solicitors and counsel, stipulate and agree that true copies of the stipulation between the parties of December 14, 1917, pertaining generally to the procedure on appeal herein, and of this present stipulation, shall be included in the Transcript of Record on Appeal herein.

Dated Los Angeles, Cal., December 18, 1917.

(Signed) RAYMOND IVES BLAKESLEE,
Solicitor for Complainant.

(Signed) ALBERT LEE STEPHENS,
City Attorney.

(Signed) FREDERICK S. LYON,
Solicitors for Defendant.

The above stipulation is hereby approved, and it is ordered accordingly.

(Signed) TRIPPET,
District Judge.

[TITLE OF COURT AND CAUSE.]

(Minute Order Permitting Intervention, Etc.)

At a stated Term, to-wit: The January Term, A. D.

1914, of the District Court of the United States of America, in and for the Southern District of California, Southern Division, held at the court room thereof, in the City of Los Angeles, on Monday, the twenty-seventh day of April, in the year of our Lord, one thousand nine hundred and fourteen.

Present: The Honorable Olin Wellborn, District Judge.
[TITLE OF COURT AND CAUSE.]

This cause coming on this day to be heard on the motion of The Pelton Water Wheel Company for leave to intervene herein as a party defendant, file its answer to the bill of complaint in this cause, and defend said cause; Raymond Ives Blakeslee, Esq., appearing as counsel for plaintiff; Joseph F. Westall, Esq., appearing as counsel for defendant; Wm. K. White, Esq., appearing as counsel for The Pelton Water Wheel Company; now, on motion of Wm. K. White, Esq., of counsel as aforesaid, it is ordered that said motion for leave to intervene be, and the same hereby is granted, and that, accordingly, The Pelton Water Wheel Company be, and it hereby is granted leave to intervene herein as a party defendant and file its answer on or before Monday, the 4th of May, 1914, to the bill of complaint in this cause, with right reserved to the complainant, when said answer of The Pelton Water Wheel Company is filed, to move to strike out said answer, or take such steps in the premises as he may be advised.

[TITLE OF COURT AND CAUSE.]

Stipulation.

The plaintiff in the above entitled suit and the inter-

venor therein, having adjusted and settled the matters involved in said suit and affecting and relating to the rights of the intervenor, it is hereby

Stipulated and agreed by and between said plaintiff and said intervenor that intervenor's amended answer in said suit may be stricken out and the intervenor be excluded as a party to said suit and that the court may make orders to such effect.

(Signed) RAYMOND IVES BLAKESLEE,
Solicitor for Plaintiff.

(Signed) WM. K. WHITE,
Solicitor for Intervenor.

Dated: January 23, 1915.

At a stated Term, to-wit: The January Term, A. D. 1915, of the District Court of the United States of America, in and for the Southern District of California, Southern Division, held at the court room thereof, in the City of Los Angeles, on Monday, the eighth day of February, in the year of our Lord, one thousand nine hundred and fifteen.

Present: The Honorable Benjamin F. Bledsoe, District Judge.

GEORGE J. HENRY, JR., Complainant,

vs.

CITY OF LOS ANGELES, Defendant,

and

THE PELTON WATER WHEEL COMPANY,

Intervenor.

No. A-87 Equity.

Pursuant to the written stipulation of the complainant

and the intervenor, The Pelton Water Wheel Company, by their solicitors of record, which is now filed in open Court, it is ordered that the amended answer herein of said intervenor be, and the same hereby is stricken out, and that said intervenor be, and it hereby is excluded as a party to said suit.

*In the United States District Court, Southern District
of California, Southern Division.* L

GEORGE J. HENRY, Jr.,
Complainant.

vs.

CITY OF LOS ANGELES,
Defendant.
No. 87-A
In Equity.

Friday, January 9, 1914, at 10:30 o'clock A. M.

The following proceedings on behalf of complainant in this action were commenced before me, I. Benjamin, Special Examiner in Chancery, pursuant to stipulation and notice, at the office of Raymond Ives Blakeslee, room 730 California building, Second and Broadway streets, Los Angeles, California, at the hour of 10:30 A. M. of Friday, January 9, 1914.

PRESENT: RAYMOND IVES BLAKESLEE, Esq.,
solicitor for complainant.

By consent adjournment was taken until the hour of half after 10 o'clock on January 15, 1914, at the same place.

GEORGE J. HENRY, Jr., complainant, being produced as a witness on his own behalf, and being first duly sworn, testifies as follows, in answer to interrogatories propounded by Mr. Blakeslee:

DIRECT EXAMINATION

Q. 1. Please state your name, age, residence and occupation.

A. George J. Henry, Jr.; 42 years old; occupation,

90 23 insert "January 15, 1914. 10:30 o'clock A. M.
Met pursuant to adjournment at the office of
Raymond Ives Blakeslee, Esq., solicitor and
counsel for complainant, at room 730 Cali-
fornia Building, Los Angeles, California, at
the hour of 10:30 o'clock A. M., January 15,
1914.

PRESENT: RAYMOND IVES BLAKES-
LEE, Esq., solicitor for complainant
JOSEPH F. WESTALL, Esq., solicitor for
defendant.

Proceedings were resumed before the Special
Examiner as follows: It is stipulated by and
between counsel for both parties that the read-
ing over and signing by the witnesses of their
respective depositions to be given herein, are
waived.

It is stipulated and agreed that the exhibits
offered in evidence by either party in this case
may be retained in the possession of the re-
spective counsel offering the same until the
termination of proofs on behalf of the re-
spective parties, and are to be transmitted
to opposing counsel for the purpose of taking
testimony by them. And, furthermore, at the
conclusion of the taking of proofs the said
exhibits may remain in the possession of re-
spective counsel subject to inspection at any
time after being offered in evidence during
office hours by opposing counsel; all exhibits
to be delivered to the Special Examiner for
filing with the Clerk, three days prior to the
day upon which the case is set for hearing."

hydraulic engineer; residence, San Francisco, California.

Q. 2. Please state what experience you have had in the field of hydraulic engineering.

A. I have had 20 years' experience as a designing, constructing and installing engineer, of water wheels, nozzles, governors and associated hydraulic specialties, and have examined a good many hundreds of water wheels, governors and nozzles, and was for 12 years chief engineer of the Pelton Water Wheel Company, in fact, until 2 years ago, at which time I went into business myself and have continued in the same line, designing, building and installing water wheels and associated power apparatus.

Q. 3. What, if any, academic or technical training have you had directed at fitting you for this occupation?

A. I had three years as special student in the University of California in the mechanical department, during which I took one year's post graduate work in the mechanical laboratories and two years' post graduate work in the chemical laboratories, leaving the University in 1894 to take a position in the electrical department of the World's Columbian Exposition. I remained on the payroll of the Columbian Exposition Company of Chicago until about January, 1894, and entered the employ of the Pelton Water Wheel Company on or about February 1, 1894, and continued in their employ until the middle of December, 1911.

Q. 4. What kind of electrical experience did you have in the connection last stated?

A. My preparation in college and employment in Chicago immediately following my college work was at

that time intended for the purpose of fitting me as an electric transmission specialist. My employment, however, since February, 1894, has been more specifically in the hydraulic field, although most of my work has been associated with electrical devices, and I am familiar with the principles that enter into their design and operation. I am an associate member of the American Institute of Electrical Engineers, a member of the American Society of Civil Engineers, and of the American Society of Mechanical Engineers.

Q. 5. Can you give the names and locations of any hydraulic installations with the setting up of which you have been connected in one way or another?

Mr. Westall: Counsel for defendant objects to the question as incompetent, irrelevant and immaterial, it not being shown that such experience has any bearing on any of the issues in this case.

Mr. Blakeslee: Counsel for complainant states that this line of questioning is merely to lay a foundation for the further testimony of the witness, as will be made clear by his subsequent deposition.

A. During this last year I designed and built and went up to Alaska to put into operation a power plant for the Alaska Gastineau Mining Company, one of the largest properties in the world. The year previous I designed and built for them a similar equipment which has been in operation for about a year. I designed and there have been built under my direction about 20 water wheels in the Alaska Treadwell Mine, 3 hydraulic plants for the Homestake Mine in South Dakota, the first plant installed by the Edison Electric Company for supplying

the Los Angeles territory and known as the Redlands plant, the second plant purchased by this same company and known as the Santa Ana plant, a portion of the Mill Creek number 3 plant purchased by this same company, a portion of the Lytle Creek plant installed by the same company, the Turbine apparatus and the accessories in the Borel plant of the Pacific Light & Power Company of Los Angeles, operating the Pacific Electric Railway. I have been associated in a professional way with the designing, construction and installation of the 60,000 kilowatt pipe line for the two Big Creek plants recently installed, one of which is now in operation by this same company; and designed and constructed and furnished to the Southern Sierras Power Company the hydraulic machinery for their number 3 plant, located near Bishop, California, and supplying power to this territory over one of the longest distance power transmissions in the world. I designed and superintended the construction of the machinery for this same company's first plant and their second plant, portions of their fourth plant, and numerous other installations throughout the Pacific Coast, and, in fact, the entire world. During the period from 1896 to 1898 I was acting as engineer for the Pelton Water Wheel Company at their New York office, which office does most of the export business of the Pelton Company, and during which time I designed and superintended the construction of a large quantity of hydraulic apparatus, which was shipped to foreign countries.

Q. 6. Are you acquainted with the disclosure of the United States letters patent 695220, issued to Lamar

Lyndon, March 11, 1902, ~~by~~ being the letters patent in suit?

A. I am.

Q. 7. Can you produce the original letters patent so identified?

(The witness produces said letters patent.)

Mr. Blakeslee: The complainant offers in evidence a copy of said United States letters patent number 695220 as Complainant's Exhibit A, being the patent in suit, the original letters patent being at all times ready in court to be produced or ready to be produced for the examination of counsel upon request. The Examiner is requested to mark such copy of said letters patent as stated.

Mr. Westall: Counsel for defendant objects to the introduction of an uncertified copy of the original patent as incompetent, and on the ground that there is not sufficient evidence to prove the grant or issuance of the letters patent referred to.

Mr. Blakeslee: In view of counsel's objection, we also offer in evidence a certified copy of the file wrapper and contents, being the certified record of said letters patent number 695220, as it exists in the United States patent office, and ask the Examiner to mark the same Complainant's Exhibit B.

Mr. Westall: Counsel for defendant repeats and renews his objection to the copy of the file wrapper and contents as incompetent, irrelevant and immaterial, as not sufficient proof of the grant or issuance of the letters patent in suit.

The said copy of said letters patent so offered in evidence is marked Complainant's Exhibit A, and the cer-

tified copy of the file wrapper and contents is marked Complainant's Exhibit B.

Q. 8. By Mr. Blakeslee: Do you know who is the present owner of the right, title and interest in and to said letters patent number 695220 in suit?

Mr. Westall: Counsel for defendant objects to the question as calling for a conclusion of the witness and as incompetent, irrelevant and immaterial.

A. Yes, sir. I am the owner, having purchased the same from Lamar Lyndon, the patentee.

Q. 9. By Mr. Blakeslee: Can you produce in evidence any evidence pertaining to the ownership of these letters patent in suit and the right, title and interest therein and thereunder?

Mr. Westall: The same objection is repeated.

A. Yes, sir; I have here an agreement.

(The witness produces a paper entitled "Agreement.")

Mr. Blakeslee: This agreement, bearing the certificate of the Commissioner of Patents, certifying to the recodation, under date September 17, 1913, is upon production handed to the Examiner with the request to spread the same upon the record and to return the same to complainant, to be always ready in court to be produced or to be produced upon demand of counsel for inspection, and the same is now submitted to counsel for defendant for inspection.

Mr. Westall: Counsel for defendant objects to the evidence and objects to the method of proving the instrument on the ground that it is incompetent, irrelevant and immaterial, no foundation laid, and that a copy spread upon the records of the original instrument is

not competent evidence and is not any evidence or any proof of the agreement in question.

Mr. Blakeslee: I will ask the Examiner to mark both said original letters patent in suit and said recorded agreement, bearing the certificate of recordation, for identification, as "Recorded agreement transferring the Lyndon patent in suit to Complainant," and "Original letters patent in suit," and to certify upon each as to such marking and to return the same to complainant's counsel.

Mr. Westall: Counsel for defendant objects to the unusual way of putting in evidence either the original patent or the purported agreement. I do not understand that it is the intention of counsel for complainant to offer either the original patent or the agreement referred to or license, in evidence, and, therefore, counsel for defendant objects to the marking by the Examiner of either of these instruments or the spreading of them in any way on the record, as not being offered in evidence, and not being part of the record in this case.

The Examiner thereupon marks the said agreement "Recorded Agreement transferring the Lyndon patent in suit to complainant, for identification," and said original letters patent in suit as "Original letters patent in suit, for identification."

The following is a copy of said "Recorded Agreement:"

AGREEMENT

THIS AGREEMENT, made and entered into this 7th day of July, 1913, by and between LAMAR LYNDON, a citizen of the United States and a resident of

the City, County and State of New York, party of the first part, and GEORGE J. HENRY, JR., a citizen of the United States and resident of the City of San Francisco, in the County of San Francisco, and State of California, party of the second part, WITNESSETH:

WHEREAS, the party of the first part is the owner of Letters Patent of the United States for Water Wheel Governor, No. 695,220, dated March 11th, 1902; and,

WHEREAS, the party of the second part is desirous of obtaining the entire right, title and interest in and to said Letters Patent No. 695,220;

NOW, THEREFORE, TO ALL WHOM IT MAY CONCERN, Be it known, by these presents, that the party of the first part and the party of the second part have entered into an agreement as follows:

1. The party of the first part warrants that he is the sole owner of all right, title and interest in and to the said Letters Patent No. 695,220; that he has not disposed of any interest of any nature whatsoever thereunder, nor any claim of any kind thereunder to any one up to the present time, and the party of the first part hereby assigns unto the party of the second part, his heirs, executors and assigns, the full right, title and interest in and to the said Letters Patent, together with all claims of any nature whatsoever for damages, profits, etc., that may have accrued in the past or which shall accrue in the future under the aforesaid Letters Patent, and he assigns unto the party of the second part, his heirs, executors and assigns the right to sue in the name of the party of the second part under said Letters Patent for any claim of any nature whatsoever which may have

arisen or which may arise thereunder, from any cause whatsoever.

2. The party of the second part hereby pays unto the party of the first part the sum of Fifteen Hundred and Fifty Dollars (\$1550) in cash, Fifty Dollars (\$50) of which has been separately paid as a consideration for an option, the receipt of which is hereby acknowledged by the party of the first part, and the party of the second part hereby agrees to deliver to the party of the first part two notes to make up the balance of a total purchase price of Twenty-five hundred and fifty Dollars (\$2550), one of said notes to be for Five Hundred Dollars (\$500), payable in three months from the present date, and the other of said notes to the amount of Five Hundred Dollars (\$500), payable in six months from the present date, both of said notes to bear interest at the rate of six per cent. (6%)

IN TESTIMONY WHEREOF, the parties hereto have hereunto set their hands and affixed their seals the date first above written.

(Signed:) Lamar Lyndon
George J. Henry, Jr.
Prindle & Wright
Attys.

State of New York,
County of New York.—ss.

On this 7th day of July, 1913, before me personally appeared LAMAR LYNDON, to me known and known to me to be one of the persons described in and who exe-

cutted the foregoing instrument, and he duly acknowledged to me that he executed the same.

Lisette Broderick

Notary Public No. 304

New York County

(Seal)

State of New York,

County of New York.—ss.

On this 7th day of July, 1913, before me personally appeared ARTHUR WRIGHT, to me known and known to me to be a member of the firm of PRINDLE & WRIGHT, which executed the foregoing instrument merely on behalf of the party of the second part, GEORGE J. HENRY, Jr., and he duly acknowledged to me that he executed the same merely on behalf of the said party of the second part, GEORGE J. HENRY, Jr., with due authority first obtained.

Lisette Broderick

Notary Public No. 304

(Seal)

New York County.

(Slip attached to foregoing document as follows:)

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

Received and Recorded on the 17th day of September, 1913, in Liber U 93, page 223 of Transfers of Patents.

IN TESTIMONY WHEREOF, I have caused the seal of the Patent Office to be hereunto affixed.

(Seal of Patent Office)

Thomas Ewing

Exd

Commissioner of Patents.

E. H. G.

(Endorsed:) Recorded Sep 17 1913 U. S. Patent Office.
Geo. J. Henry, Jr. 733 Rialto Bldg San Francisco, Cal.
(In pencil) Fee \$2 Pd.

(Endorsed:) U. S. District Court, Southern District of
California, Southern Division. George J. Henry, Jr. v
City of Los Angeles. In Equity No. A 87. Recorded
Agreement transferring the Lyndon Patent in suit to
Complainant. Marked for Identification. Jan 15, 1914.

I. Benjamin

Special Examiner.

Q. 10. By Mr. Blakeslee: I will now ask you to
summarize the disclosure of the Lyndon patent in suit,
putting such disclosure into a statement in as brief a
compass as possible.

Mr. Westall: Counsel for the defendant objects to
the question as incompetent, irrelevant and immaterial,
as calling for a conclusion of the witness, no proper
foundation having been laid. It is further objected to
as calling for not the best evidence.

A. Mr. Lyndon's invention as disclosed in the patent
in suit, number 695220, is for apparatus for accomplish-
ing automatically the speed control or governing of
water wheels; for accomplishing this purpose he pro-
vides, first, a device sensitive to the speed of the water
wheel, which device sets into operation, second, a con-
troller, said controller being for the purpose of bringing
about the movement of the water wheel gate or gates
by, third, power means, which power means may shift
the gate in either direction, that is, to admit more or
less water to the water wheel, for the purpose of meet-
ing added or subtracted power demands. Fourth, a

water gate or valve, the shifting of which causes a variation in the water flow to the water wheel. Fifth, a by-pass to permit a greater or less quantity of water to be discharged from the pipe line or water conduit, to compensate for less or more water being supplied through the water gate, and, sixth, returning devices for the governor, said by-pass being connected with and operated by said governor means for the purpose of preventing inertia effects in the pipe lines. Seventh, returning devices of the by-pass. Eighth, a device set into action by the controller and acting to shift the controller so as to prevent the governor over-running.

Q. 11. By Mr. Blakeslee: Please define more fully what meaning you intend to convey by the term "governor over-running."

Mr. Westall: The same objection is repeated.

A. In governors as previously applied and installed, the speed control was not as accurate as desired, in that the governor would not bring the speed of the water wheel shaft back exactly to normal, but would bring it back only to a speed slightly greater than or slightly less than normal. The effect of this on electrical transmission service was very bad in that, for example, incandescent lights being supplied from this service would burn either too brightly or not brightly enough, the effect of the speed difference being greatly accentuated in such devices as incandescent lights, resulting in dissatisfied customers and unsatisfactory electric service by power companies. The demand for accurate speed control, that is a governor controlling the water wheel devices so that the speed would be brought back accurately to the cor-

rect running speed, was very great. Mr. Lyndon's introducing his clutch under the control of the movement of the controller, and for the purpose of re-establishing correct speed, so that the governor would not "over-run," was a decided step forward in the art.

Mr. Westall: Counsel for defendant moves that the latter part of the answer, beginning with "Mr. Lyndon" be stricken out as not responsive to the question, as being a mere conclusion of the witness, and as being mere matter of opinion outside of the issues and not pertinent to any question involved in this case.

Mr. Blakeslee: It is pointed out that the present brief description or exposition of the disclosure of the patent in suit is for the purpose of putting before the court in succinct form the issues involved in this suit, and the correctness of which presentation is, of course, open to attack by the defendant at the proper time and by the proper method. The patent, of course, speaks for itself, and the present description is merely for the purpose of digesting the disclosure of the patent.

Q. 12. By Mr. Blakeslee: Please point out in the Lyndon patent in suit any specific part to which you have referred in your last answer in mentioning a "clutch."

Mr. Westall: Counsel for defendant objects to the question on the ground that there is no proper foundation laid.

A. I referred specifically in the Lyndon patent to the clutch consisting of plates 22 and 23, the latter actuated by the lever 24, setting into operation thereby plate 22 and rod 25, with its associated springs and connec-

tions, thereby causing the return of the controller to inoperative position to prevent the governor over-running.

Q. 13. By Mr. Blakeslee: Through what part is actuation imparted to this clutch which you have pointed out?

A. In the Lyndon patent it is accomplished through magnets 31-32, actuated from the dynamo 8, which in the Lyndon patent is the means adopted for sensitiveness to speed and for setting into operation the controller and subsequent governing devices.

Q. 14. And when the clutch is in operative condition, by what part is power applied through it?

A. When the clutch is set into operation by the aforesaid means, power is applied to it through shaft 12.

Q. 15. Please now state the operative relation between the water gate and the by-pass disclosed in the Lyndon patent in suit.

A. The operative relation between these two devices is such that the water gate being moved in a closing direction by the governor, the by-pass is moved in an opening direction; and during governor action of the water wheel gate to shift it in an opening direction to supply a greater quantity of water to the wheel through the demand of the governor, the by-pass is automatically and coincidentally therewith moved in a closing direction, these movements preventing the inertia effects of the water column in the main supply pipe, which would otherwise occur, due to a change of water velocity in the main pipe line as quickly as would be required to secure good speed regulation.

Q. 16. Can you point out any feature or part of the

disclosure of the Lyndon patent in suit by or through which the coincident action of the water gate and by-pass is caused?

A. Yes, sir. Through the rotation of shaft 20 the water gates are moved in one direction and the by-pass 48 in the opposite direction, the direction in this case referring to opening or closing.

Q. 17. And what drives the shaft 20?

A. The shaft 20 is driven from the power shaft 6 and gears 4 and 5 through the governor-actuated clutches and gears to shaft 12, and thence to shaft 20; and upon the governor operation magnets 64 set into operation clutch-plate 58 for shifting the by-pass through means for the rotation of the gate operating shaft 20, thus bringing about a movement of the by-pass valve to open as the gates close, or to close as the gates open, under the control of the governor.

Q. 18. Please a little more fully set forth your understanding of the pressures occurring in the water of the pipe or conduit with reference to which the governor, being the subject of the Lyndon patent in suit, operates for correction as you have testified?

A. In water wheel plants we have a supply pipe or "penstock" supplying water to a wheel or wheels. The quantity of water requisite for driving the wheel varies from time to time according to the demand for power from the wheel. As, for example, if the wheel is driving a saw mill, when a log is put against the saw the speed will fall unless more water be thrown onto the wheel. If the wheel be driving an electric generator, which generator is supplying street car service, the starting or

stopping of the electric car will cause more or less power to be required from the wheel, and to prevent a variation in the speed of the wheel, which speed must be maintained constant to give good service, it is necessary that we automatically and very quickly supply the wheel with the necessary added water from the supply pipe or penstock to meet this new demand for power. Or, if a less quantity of power is required from the wheel, it is necessary that we quickly and automatically reduce by the governor the water quantity being supplied to the wheel, and we are confronted with a large mass of water moving at a fixed velocity, which velocity must be very quickly changed to meet these conditions, unless we introduce some other device which will enable us to quickly vary the power supplied to the water wheel without changing the water velocity in the pipe at a dangerously quick rate. The method adopted by Mr. Lyndon is that of quickly reducing or increasing the water quantities supplied to the water wheel, and, coincident with the movement of the gate, to accomplish this, opening or closing as may be required, a by-pass ^{is used} so as to retain the velocity of water in the supply pipe substantially constant during the period of governor movement, and thus preventing the formation of what is popularly known as a water ram, and technically known as the inertia effect of a moving column of water in the supply pipe.

Q. 19. Without any such governing device acting to stabilize the flow of water to and past the water gate, what is the effect upon the volume of water passing the gate when the gate is moved toward closed position?

A. The first effect is, as pointed out in the Lyndon

patent, that of a momentarily increased velocity of flow occasioned by the water ram or inertia of the moving water column

Q. 20. And what will be the effect of this increased velocity upon the water wheel to which such water at increased velocity is supplied?

A. The effect is that of increasing the speed of the water wheel, and, therefore, counteracting the effort made by the governor, unless a by-pass be used to prevent the formation of this increased velocity brought about by the water ram.

Q. 21. And conversely when the water gate is further open or further removed from closed position, what is the effect upon the water wheel?

A. As the gate is opened the first effect is that of reducing the speed of the water wheel. It will be noted that both of these effects are contrary to that desired to be obtained and, therefore, are defects which it was Mr. Lyndon's desire to correct and which his invention does overcome.

Q. 22. Now, in accordance with the disclosure of the Lyndon patent, what takes place with respect to the pipes when the water gate is moved further from or away from closed position?

A. As the water gate is moved in its opening direction, the by-pass is moved in a closing direction, thus retaining the velocity of the water in the pipe line constant by the governor action, and, therefore, more quickly accomplishing a restoration to correct speed.

Q. 23. When the water gate is moved in the opposite direction or toward closed position, what is the effect

produced by the operation of the by-pass in the Lyndon patent?

A. In this case the by-pass is moved in an opening direction. That is, contrary to the direction of the movement of the water gate. The velocity of the water in the pipe is retained substantially constant and, therefore, governing to correct speed more quickly and more accurately accomplished.

Q. 24. Is or is not such governing action equally beneficial under all conditions met with in installations wherein there are variations or differences in the head or pressure of the water in the pipe or penstock?

A. There are different sets of conditions which call for different adjustment of governing means. In the case of a long pipe line laid on a very gentle slope it is obvious that upon opening a gate at the lower end of the pipe the water will not accelerate as quickly as it would in the case of a pipe laid upon a steep grade. In order to accomplish accurate speed regulation it is customary to make the water gates actuated by governing devices shift to correct for power requirements from the water wheel in an extremely short period of time, two to five seconds being in ordinary practice the limit allowed for the movement of the gates from full open to full closed. In the case of a long pipe line laid upon a gentle slope, as is very frequently the case, in turbine installations such as illustrated in Mr. Lyndon's drawing figure 1, the rate with which the water will accelerate when the gate is open is such that the full velocity of flow will not be attained in the period of governor movement, as, for example, within 5 seconds, as mentioned

above. It is therefore obvious that under such conditions the power would not be supplied to the wheel as fast as called for by the governor. In the case, however, of steep pipe lines, that is, where the head is high compared with the length of the pipe line, the action of gravity upon the water in the pipe is such that the water will accelerate very much faster than in the previous case, such acceleration in many cases being at a rate so that the water will attain its full required velocity within the time of governor movement of the gates. Where such is the case there is obviously no necessity for maintaining an initial velocity in the water in the pipe line, whereas in the first case with the long pipe line on the gentle slope first mentioned it is advisable to maintain an initial velocity ready to respond to the movement of the water gate by the governor.

Mr. Westall: Counsel for the defendant moves to strike out all that portion of the answer beginning with the words "in order to accomplish accurate speed regulation" as not responsive to the question.

Q. 25. By Mr. Blakeslee: Please state which action of the governor of the Lyndon patent is more beneficial when a greater normal pressure exists in the water supply pipe, and which action is more beneficial when a lesser normal pressure exists in the water supply pipe?

Mr. Westall: Counsel for the defendant objects to the question as vague and indefinite, "what is more beneficial" being not clear.

A. In the speed control of water wheels the water ram produced on slowing up the column of water in the supply pipe is proportional to the length of pipe, the

velocity of water, the amount of slowing up or changing velocity, and, inversely, to the time required to accomplish the retardation or velocity change. Whereas on increasing the velocity we are dependent entirely upon the action of gravity to accelerate the water column in the pipe line regardless of the amount the gates may be opened. It will therefore be necessary for us in all cases where we quickly close the gates, regardless of the water pressure or head, and dependent only on the length of pipe and the velocities involved, to provide a by-pass to prevent too rapid velocity change if we are going to prevent the formation of a dangerous water ram. The opposite movement, however, that of accelerating the water in the pipe line, is one that we depend upon gravity to accomplish. Consequently, where the pipe is sufficiently steep to bring about this acceleration in a time equal to or less than the movement of the governor, it is not necessary for us to initially retain a water movement in the pipe. I would therefore say that in all cases of long pipe lines it is necessary to provide an opening of the by-pass proportional to the closing gate to prevent the inertia effect or water ram, and that in all cases of long pipe lines with low heads or pressures it is necessary to provide a closing movement of the by-pass in direct proportion to the opening of the water gate.

Mr. Westall: Counsel for the defendant moves that the answer be stricken out as not responsive to the question, and as containing matters of opinion concerning the operation or supposed operation of the device of the patent in suit, which has not been inquired about, and which is incompetent, irrelevant and immaterial.

Q. 26. By Mr. Blakeslee: Under these different conditions appurtenant to the water supply and the head or pressure thereof, what, if any, differences will be necessary in adjusting or setting the by-pass in relation to its positions before governing action commences?

Mr. Westall: Counsel for the defendant objects to the question as vague and indefinite.

A. To secure accurate speed regulation and to prevent the inertia effect in the pipe line, it will be necessary to in all cases set the by-pass so that the governor will open the by-pass at a rate substantially equal to the closing rate of the water gates. But in cases where the pipe line is steep, that is, the pressure is great as compared with the length of the pipe line, and where water acceleration in the pipe line will take place at a rate as quickly as demanded by the governor, it will not be necessary to retain the by-pass valve in an open position before governor movement, it being only necessary that a velocity in the pipe line equal to the maximum demand can be reached in a period equal to that of governor movement. For example, if the governor be set to make its full movement in 5 seconds of time and our pipe line is on such a slope that the water will attain its maximum velocity equal to the full load in 10 seconds of time, the by-pass would then be set to discharge one-half of the quantity of water when in its normal position, the period of opening in 5 seconds being sufficient to enable the water to accelerate from 5 feet per second to the maximum of 10 feet per second. If, on the other hand, the pipe line be steep enough so that the water will attain its maximum velocity from zero in 5 seconds

or less of time, and the governor requires 5 seconds to make its full stroke, the normal position of the by-pass then could be fully closed, because we are dealing with the inertia effect which is entirely taken care of by gravity, and have only to provide by-pass discharge on a closing movement to prevent the previously mentioned water ram.

Q. 27. By Mr. Blakeslee: What results from the utilization of the governor for water wheels disclosed in the Lyndon patent in the direction of water consumption during a given complete governing action?

Mr. Westall: Counsel for defendant objects to the question as incompetent, irrelevant and immaterial, and as not touching or affecting any issue in this case.

A. By the use of Mr. Lyndon's governor and associated by-pass, the return of the by-pass after it has been opened by governor movement to a position such as to slowly retard the water flow in the pipe, accomplishes water economy, as the water flowing at a reduced velocity in the pipe results in the use of less water on the water wheel during periods of reduced load. The degree of economy so effected is, as pointed out in my previous answers, dependent upon the degree to which the water velocity may be retarded, and still be such as to enable the governor to quickly re-establish an increased velocity in the pipe as may be required for increasing loads on the water wheel. This water economy is a feature of great importance naturally resulting from the by-pass governing device.

Q. 28. By Mr. Blakeslee: Please now point out in the disclosure of the Lyndon patent the parts or groups

of parts which directly cause the actuation of the gears 9 and 10 to set into operation the shaft 12 through the gear 11.

Mr. Westall: Counsel for the defendant objects to the question in that no proper foundation has been laid for the testimony of this witness as to the disclosure of the Lyndon patent, in that it has not been shown that he is competent to understand the drawings or that he does understand the drawings and the disclosures there made.

Mr. Blakeslee: The answers of the witness taken together with the disclosure of the Lyndon patent in suit will speak for themselves as to the witness' qualifications to answer the questions which are being put.

A. The magnets 15 and 16 operate on lever 14 through the armature 17, the lever 14 being pivoted at 14a, said lever shifting a double-ended clutch. After the magnet has been energized, it will engage gear 9 or 10, causing a corresponding movement of shaft 12 in one direction or the other, depending on which magnet has been energized, and, therefore, a movement of shaft 20 shifting the water gate in one direction and the by-pass in an inverse direction.

Q. 29. When either one or the other of the gears 9 or 10 is meshed with the gear 11, what causes as a prime mover the rotation of the shaft 12?

A. The movement of shaft 12 is effected through power transmitted from shaft 6 through gears 4 and 5 and main operating turbine shaft 3, as a power means under the control of a device sensitive to speed variation, setting into operation gear 9 or 10 as previously discussed.

Q. 30. By what parts is the energization of the electro magnets 15 and the energization of the electro magnets 16 controlled?

A. The energization of magnets 15 is accomplished through the closing of an electric circuit at contacts 40 and 40a, thus energizing them from dynamo 8; whereas magnets 16 are energized from contacts 41 and 41a from dynamo 8, in both instances the said contacts being brought about through the operation of plunger rod 35 actuated by solenoid 33, this being the controller which is responsive to the speed changes of dynamo 8. Dynamo 8 is driven from the main water wheel shaft and is sensitive to the variations of speed therein by a variation of its voltage, said voltage variation affecting solenoid 33 as above mentioned.

Q. 31. What directly drives the generator 8?

A. The generator 8 is driven from the water wheel shaft through shaft 6, pulley 7 and suitable belting.

Q. 32. What controls the energization of electro magnets 32 controlling the lever 24 for setting the clutch 22-23, as you have testified?

A. Said magnets are energized through contacts 45 and 46, and 45a and 46a, upon movement of rod 35, actuated by solenoid 33. Upon these contacts being made the magnets are energized and the returning clutch plates 22 and 23 set into movement, the shifting of rod 25 accomplished through the returning of rod 26 through the action of the springs, and upon the release of plate 23 on the de-energizing of magnets 31 and 32, rod 25 is re-set in original position by springs 29, 29, to be ready for another governing movement, and this operation has prevented the "over-running" of the governor.

By consent of counsel an adjournment is now taken until 2 o'clock P. M.

Thursday, January 15, 1914, 2 o'clock P. M.

This being the time to which the further taking of depositions was continued, the direct examination of the witness GEORGE J. HENRY, Jr., is resumed.

Q. 33. By Mr. Blakeslee: You have referred to the energization of the electro magnets 64. Please state how in the Lyndon patent disclosure this energization is controlled.

A. The energization of these magnets is controlled through contacts 100, 101, 103 and 104, which completes the circuit, allowing them to be energized from the dynamo before mentioned.

Q. 34. What produces this contact and in what manner?

A. The contact is brought about through the shifting of the lever connections actuated by rod 35, which in turn is actuated by solenoid 33 which is responsive to the voltage changes from the dynamo, and, therefore, speed changes in the water wheel, as previously described.

Q. 35. What, if any, relation takes place between this last stated operation involving parts 100, 101, 103 and 104, and the closing of the circuits at the contacts 40 and 41?

A. When contacts 100 and 101 are closed with 103 and 104 respectively, so that magnet 64 is energized, the contacts 40 ~~and~~ 41 are engaged with the respective contacts 40a or 41a.

Q. 36. And when contact is broken at the contacts

40 and 41, what, if anything, takes place at contacts 100 and 101 and their co-operating contacts?

A. They also are broken.

Q. 37. Therefore, what is the relation with respect to the energization and de-energization between the clutch magnets 15 and 16 and the magnet 64?

A. When either of the magnets 15 or 16 is energized magnet 64 is also energized. And whenever 15 or 16 is de-energized, so also are magnets 64 de-energized.

Q. 38. What is the relation between the closing and breaking of circuit at contacts 100 and 101 and the making and breaking of circuits at contacts 45a and 46a?

A. All four of these contacts are made and broken with their associated contacts or anvil pieces at substantially the same time.

Q. 39. And, further, what is the relation between the making and breaking of circuits at contacts 45a, 46a, and 100 and 101, and the making and breaking of circuits at contacts 40 and 41?

A. Whenever contacts are made at either 40 or 41, contacts are made at 45a, 46a, 100 and 101, with their anvil pieces 45, 46, 103 and 104.

Q. 40. Now, therefore, what is the relation as to the coincidence or the contrary between the energization of magnets 15 or 16, on the one hand, magnets 32 on the other hand, and, still further, magnet 64?

A. Magnets 15 or 16, whichever is energized, correspond with an energization of magnet 32 and of magnet 64.

Q. 41. When the clutch 22-23 is operated after being set by lever 24 during a governing operation, what results with respect to the energization or de-energization

of either the magnets 15 or 16 and the magnets 32 and the magnets 64?

A. When sufficient movement has been produced in the returning mechanism, rod 25 and associated parts, spring pressure is put upon rod 26 until sufficient tension has been established to cause a break in the contact 40 or 41, depending on which direction the governor is shifting the gates, and when said break occurs corresponding magnet 15 or 16 is de-energized, interrupting the governing action before it has over-run the proper amount. And, as described in my previous answer, the corresponding contacts are broken and magnets 32 and 64 are also de-energized.

Q. 42. In the rotation of shaft 20, controlling the water gate, in the governor action what operations are produced and what effects are caused directly under the control of said shaft?

A. The rotation of shaft 20 causes a movement of water gate controlling the flow of water to the turbine from the pipe line. Its rotation also when magnet 64 is energized causes a rotation of the sheave wheel 54, by connection of the clutch plates 57 and 58, the latter being shifted by the energized magnet, which movement of the sheave wheel causes a corresponding inverse movement of by-pass valve 48.

Q. 43. Continued rotation of this shaft 20 causes what action?

A. If shaft 20 be rotated to a point beyond that sufficient to fully open or fully close the gates, the circuits energizing the magnets are broken through contact pieces 84, 85, 86 and 87, by the action of the tappets and screw

plate 77, the latter arriving at one end or the other of the screw threaded portion of shaft 20, and engaging one or the other of said tappets, causing a shifting of the bell crank shown and a break in the corresponding electro magnet, such breaks taking place between 84 and contact 86, and lever 87 and contact 85. Also continued rotation of shaft 20 through the rotation of sheave 54, which occurs when magnet 64 is energized, causes the pin 73 in its rotation to lift arm 74, causing a break in the circuit of the energized magnet 64, thus preventing further rotation of said sheave 54 by releasing clutch plate 58, thus preventing the turning of by-pass valve to any further degree, and enabling said by-pass valve to return to its original position under the action of the weight 70.

Q. 44. When the circuit is broken at 84, 85, 86 and 87, what magnets are de-energized?

A. These contacts control or limit the energization of magnets 15 and 16. When shaft 20 has rotated to its limit in one direction the energized magnet which brought about this rotation is de-energized to prevent further rotation in the same direction; and when movement has reached its limit in the opposite direction, the other magnet is de-energized to prevent further movement in such direction.

Q. 45. What is the object, as you make it out, of providing the means you have just discussed for de-energizing magnets 64 and preventing further movement of the by-pass valve, and of breaking the circuit through the magnets 15 or 16 which, when energized, caused rotation of shaft 12 and a consequent rotation of shaft 20?

A. Magnets 64 may be de-energized through the lift-

ing of arm 74, independent of magnets 15 or 16. These latter magnets are de-energized for the purpose of preventing a jamming and consequent breaking in the governor parts. Magnet 64, on the other hand, is de-energized when the by-pass valve has reached an open position to permit of its slow closure independent of any subsequent movement taking place in shaft 20.

Q. 46. What is the object of slowly closing the by-pass valve?

A. The object of slowly closing the by-pass valve is to accomplish a gradual retardation of velocity of water column in the main pipe at a slow and safe rate, to effect water economy, and without interfering with the necessarily quick action of the governor to accomplish good governing.

Q. 47. What pipe, as shown in the patent drawing, do you refer to in your last answer?

A. There is only a small portion of the main supply pipe shown in Mr. Lyndon's patent drawing, from which the by-pass pipe 47 leads.

Q. 48. That is, if I understand you correctly, to effect retardation of the flow in the pipe gradually?

A. Yes; in the pipe of which figure 1 is the lower terminal, connected to the turbine and by-pass.

Q. 49. And this retardation accompanies what movement of the water gate?

A. The water gate, whose shaft is shown at 21b projecting from the turbine case 2, has previously been closed through the rotation of shaft 20 and by-pass 48 has been correspondingly opened to provide adequate by-pass for the water no longer being required to main-

tain the load on the turbine. By-pass 48 then slowly closes gradually retarding the column of water in the pipe line, and at a rate which will not cause a dangerous water hammer.

Q. 50. And what would be the effect if there were an abrupt closing of the by-pass valve 48 at this time?

A. If the by-pass valve 48 were closed too quickly there would be a water ram produced in the pipe line just as there would be if the turbine gates were closed too quickly without a by-pass.

Q. 51. Please set forth somewhat more fully the controlling effect of the generator 8 upon the energization of solenoid 33?

A. The generator 8 is responsive to speed changes, and any change in speed of the dynamo 8 causes a variation in its voltage, and, therefore, in the supply of current to the solenoid 33, causing thereby a variation in the pull of said solenoid against its corepiece in proportion to said speed changes of dynamo 8.

Q. 52. You have testified that you are conversant with electrical matters and hydraulic engineering. Have you similarly had occasion to come into contact with patents relating to this class of apparatus?

A. Yes; I have.

Q. 53. In what manner?

A. I am the inventor and patentee of about 18 or 20 United States patents, and some few foreign patents. There are about probably 500,000 horsepower of water power apparatus in use involving apparatus of my invention and covered by my patents.

Q. 54. Have you any applications for patents at the present time pending?

A. Yes sir; I have several applications pending at the present time.

Q. 55. Who prepared the specifications for these applications and the drawings?

A. I prepared all of the applications and under my direction I have had the drawings prepared for all of my applications during the last two years. Previous to this I engaged patent attorneys to do this for me. Several of my pending applications are allowed but not yet issued.

Q. 56. Have you had occasion to examine any United States letters patent in connection with your engineering practice?

A. Yes; very frequently.

Q. 57. Prior to giving your present deposition in this case did you examine the Lyndon patent in suit?

A. Yes sir; I did, very thoroughly. The first time was some 4 or 5 years ago, and several times since then.

Q. 58. I will ask you if you can produce any drawing which purports to show the parts and features disclosed in the Lyndon patent in suit, arranged or displayed otherwise than in the drawings of the patent in suit?

Mr. Westall: Counsel for the defendant objects to the question and to the production of any such drawing as incompetent, irrelevant and immaterial. The patent speaks for itself.

A. Yes sir. To facilitate the examination of the drawings in the Lyndon patent I have prepared a draw-

ing showing the devices disclosed in the Lyndon patent, and which I now have before me.

Q. 59. By Mr. Blakeslee: Did you produce this drawing personally?

A. No sir; I had it prepared under my direction. I did some of the work on it.

Q. 60. What method or plan did you pursue in laying out this drawing or ordering it to be laid out?

A. I made a complete sketch showing the various parts and then had one of the draftsmen in my drafting room lay it out as a line drawing under my direction. I then lettered and numbered the various parts and shaded it so that it could be easy of examination.

Q. 61. What relation, if any, exists between the lettering and numbering on this drawing and the lettering and numbering on the drawings of the Lyndon patent in suit?

A. This drawing corresponds exactly in these respects to the drawings in the Lyndon patent.

Q. 62. What was your particular object in producing this drawing?

A. To make it easier for the examination of the court in tracing out the various parts and several movements of the different parts in the Lyndon patent.

Q. 63. Are there any differences between this drawing and the disclosure of the drawings in the patent in suit with respect to the connection, the control and the working inter-relation of the several parts and features?

A. No sir.

Mr. Blakeslee: The drawing under discussion is offered in evidence as Complainant's Exhibit C, and it is

asked that the same be so marked. In so offering this drawing it is stated^d that our purpose in introducing it is merely to assist in more clearly presenting the showing of the drawings of the Lyndon patent in suit, and particularly figure 1 thereof, for assistance in clarifying such disclosure, the complexity of structure shown in such figure 1 making the assistance of this drawing, while not necessary, useful in discussing and pointing out the issues involved. And this drawing is, of course, offered subject to correction, if correction be necessary, of any discrepancies which may exist between it and the construction disclosed in the drawings of the patent in suit. Nor do we offer this drawing as an agreed embodiment of the invention covered by the patent in suit where any such discrepancies may be found.

Mr. Westall: Counsel for the defendant objects to the introduction and consideration of the drawing offered in evidence, on the ground that it is not the best evidence, the patent in suit speaking for itself. And on the ground, further, that it has not been proven to be accurate in all details and might be misleading as to the actual operation of the device shown and described in the patent in suit.

Q. 64. By Mr. Blakeslee: Can you produce in this connection for the purpose of clarity a reproduction of figure 1 of the patent in suit on a larger scale?

A. Yes; I have here a photographic enlargement of said figure 1.

Q. 65. By whom was this enlargement produced?

A. By a photographer in San Francisco in my presence from figure 1 of the original patent which has al-

ready been marked for identification by the Examiner.

Mr. Blakeslee: The complainant offers in evidence the photograph just submitted as Complainant's Exhibit D.

Mr. Westall: Counsel for defendant objects to the receiving in evidence of the drawing or photographic copy referred to, on the ground that it is not the best evidence, and on the ground that it has not been sufficiently shown to be a copy of any of the drawings of the patent in suit.

The said photographic copy is thereupon marked by the Examiner as Complainant's Exhibit D.

Q. 66. By Mr. Blakeslee: Have you seen any apparatus embodying ~~the~~ governor construction combined with a water gate and by-pass wherein the by-pass and water gate under the control of the governor operated inversely, each with respect to the other?

A. Yes sir. I have examined such apparatus in operation at the Cottonwood plant of the Los Angeles aqueduct, and at the Division No. 2 plant of the Los Angeles aqueduct, and made photographs of them in company with Mr. Alfred H. Dahler on January 2nd of this year in Inyo County, California, these two plants being plants that were in use, furnishing regular electric service to the towns of Independence and Lone Pine by electric transmission.

Q. 67. When did you see these plants?

A. On January 2, 1914.

Q. 68. Can you produce any showing of what you saw on January 2, 1914, as related in your last answer, in Inyo County, California, on the line of the Los Angeles aqueduct?

A. Yes sir.

(The witness produces eight photographs.)

Q. 69. I will ask you to briefly state where each of these photographs was taken and as you so relate to mark them successively with identifying numbers.

A. The photograph which I have marked No. 1 ~~and E~~ in the upper right hand corner is the interior at the Cottonwood plant, showing the water wheel housing within which operates the water wheel for driving the generator on the right hand side. The governor in operation on the left and the rock shaft operating the water gate, and by-pass nozzle just above the floor on the left of the wheel housing.

The photograph which I have marked 2 in the upper right hand corner illustrates the connections below the floor, the floor plate being removed, which are operated from the governor rock shaft mentioned in photograph 1. This is also at the Cottonwood plant.

The photograph which I have marked number 3 in the upper right hand corner shows the governor in operation with the rock shaft above the floor for connecting to the water gate operating means, and by-pass. Also at the Cottonwood plant.

The photograph which I have marked number 4 ~~and H~~ in the upper right hand corner was taken by me on the same day at the plant known as Division Creek number 2 plant of the Los Angeles aqueduct, and shows the nozzle and water gate operating means and governor and connections to the by-pass.

The photograph which I have marked number 5 ~~and I~~ in the upper right hand corner shows in further detail the connections of the water gate, its operating means,

and the connections to the by-pass valve. This was also at the Division Creek plant number 2 above mentioned.

The photograph which I have marked number 6 ~~and~~ ~~X~~ in the upper right hand corner shows in further detail the governor with its returning devices and clutch set into operation by the controller for preventing the governor "over-running", and the connections between the governor and the water gate operating means and by-pass. This was also at the Division Creek plant number 2 above mentioned.

The photograph which I have marked number 7 ~~and~~ ~~X~~ in the upper right hand corner is an enlarged view of the upper portion of the governor, showing the parts of the clutch set into operation by the controller for preventing the governor "over-running". This is also at the Division Creek number 2 plant mentioned above.

The photograph which I have marked number 8 ~~and~~ ~~X~~ in the upper right hand corner is an enlarged view of the water wheel housing and pressure gauge of the water wheel unit at Division Creek plant number 2 which I have previously mentioned.

Q. 70. Please state who took these photographs.

A. I took all of the original negatives of these photographs and had the prints made at a professional photographer's in San Francisco under my direction. They are enlargements from the original negatives.

Q. 71. I notice in several of these enlarged photographs the picture of some person. Who, if you know, is represented in these likenesses?

A. Mr. Alfred H. Dahler appears in photographs 3,

4 and 1. He is the party who I previously testified accompanied me on this trip.

Q. 72. Can you produce any further photographs showing what you found on the aqueduct in Inyo county?
(The witness produces four further photographs.)

Q. 73. Please further briefly state where these photographs were taken, by whom, and what they show.

A. The photograph which I have marked number 9 ~~and M~~ in the upper right hand corner is an exterior view of the Cottonwood plant with Mr. Dahler, previously mentioned, in the foreground. This shows the water discharging from the power house while the apparatus shown in the previous photographs of the Cottonwood plant was in operation.

The photograph which I have marked number 10 ~~and N~~ in the upper right hand corner is also an exterior view showing in further detail the discharge of the water from the apparatus in the Cottonwood plant to which I have previously testified, Mr. Dahler likewise being in the foreground.

The photograph which I have marked number 11 ~~and O~~ in the upper right hand corner is a photograph of one of the electrically operated dredges in the Los Angeles aqueduct to which the power plants at Cottonwood and Division Creek number 2 supplied power, the transformer station for electrical connections being shown on the float just back of the dredge. This dredge is on the line of the aqueduct between Lone Pine and Independence in Inyo County.

The photograph which I have marked number 12 ~~and P~~ in the upper right hand corner is an exterior view of

the Division Creek number 2 power plant previously testified to, showing the discharge tailrace from the power house into the balancing reservoir, which latter reservoir feeds to the division ^{Creek} plant number 1.

Q. 74. Who took each of these photographs?

A. They are prints from the original negatives taken by me and developed, printed and mounted under my instructions for the purposes of this case.

Q. 75. For assistance in making reference to these twelve photographs, I will ask you to mark each one testified to by its distinguishing figure, with the name of the plant or the place of the location.

A. I have so marked all of these photographs.

Mr. Blakeslee: Complainant offers in evidence the photographs just produced and discussed, twelve in number, and the Examiner is asked to mark the same consecutively in accordance with the numbers thereon, Complainant's Exhibits respectively E, F, G, H, I, J, K, L, M, N, O, P.

Mr. Westall: Counsel for defendant objects to the introduction of these photographs just numbered, and each of them, on the ground that they are incompetent, irrelevant and immaterial; that no proper foundation has been laid for their introduction; that it has not been shown that they affect any of the issues in this case.

Mr. Blakeslee: In view of counsel's objection, we now call upon the defendant to produce any and all drawings, blueprints, maps, diagrams, sketches, specifications, and contracts, which were followed or called for or disclosed or illustrate or explain the power plants installed by the City of Los Angeles, the defendant, upon the line

of the Los Angeles aqueduct, in Inyo County, California. As a foundation for this request, we point out to counsel for defendant that the present witness in making out this, his prima facie case has testified that in the two plants, namely, the Cottonwood plant and the Division Creek plant number 2, he saw within the present month, namely, on the 2nd day of January, 1914, the following construction and inter-relation of parts and features, to-wit: A governor, a water gate, a by-pass, a means whereby the water gate and by-pass are inversely operated under the control of the governor. And we give notice that unless production of these enumerated things is made by the defendant before the completion of the prima facie case, we shall be compelled to initiate steps to enforce the production of the enumerated documents, papers, drawings and other things called for, as the court may direct, or, having previously requested the assistance of the defendant in inspecting and demonstrating these plants, we shall be compelled to ask the court for an order of inspection; or we shall be compelled to take both procedures if we so elect. It is further stated that complainant ~~when~~^{is} attempting to make out his prima facie case with the best of material and opportunity which are available, in order that the court may have before it as fully as possible the nature of the cause of action and the facts which we contend to support the same.

Mr. Westall: Counsel for defendant denies that complaint has made out any case or has made any showing which should entitle the complainant to the production of the documents or records which have been re-

quested. There is absolutely no evidence offered tending to show an infringement of the patent sued upon, and it has not been shown in what respect the different records enumerated would be competent or material evidence upon any issue in this case. Furthermore, the request is of a very general and vague nature, not defining what complainant conceives he is entitled to have produced upon this hearing. Counsel for the defendant denies that the witness has testified as was stated by counsel in his demand for the records and papers which he has requested, and states that even if the testimony of the witness had been as stated it would not be determinative and it would not even be a *prima facie* showing sufficient to base the request which has been made for the production of the documents which have been called for. Counsel for the defendant denies that any showing has thus far been made as to infringement by the defendant of the patent in suit. Counsel for the defendant further states that the records and documents called for relating to the construction of the aqueduct are not shown to have any pertinence to any issue in this case.

Mr. Blakeslee: As to what the witness testified the record speaks for itself. The defendant is given this opportunity to enable these issues to go fully before the court or to assist in such presentation, and the notice and request just given stand of record.

The Examiner thereupon marks the photographs last offered in evidence respectively as Complainant's Exhibits E, F, G, H, I, J, K, L, M, N, O, and P.

Q. 76: By Mr. Blakeslee: Can you produce a map or showing of the location of the Cottonwood power plant

and Division Creek power plant number 2 as to which you have just testified?

Mr. Westall: Counsel for the defendant objects to the question as incompetent irrelevant and immaterial. The location of the power plant spoken of not having been shown to have any pertinence to this case and not being within any of the issues raised by the pleadings herein, is irrelevant, immaterial and incompetent.

Mr. Blakeslee: The attention of the defendant is called to the pleadings in this case which specifically refer to certain power plants in Inyo County, California.

(The witness produces a map entitled "Map showing location of power plants along the line of the aqueduct and surrounding country, June 30, 1910, taken from the third annual report of the Los Angeles aqueduct, with changes.)

Q. 77. By Mr. Blakeslee: Please note, if you can, upon this map by lead lines and the letters A and B, the plants which I have referred to in the previous question.

A. I have marked in ink an arrow marked "a" pointing to the Cottonwood plant on the map; and an arrow marked "b" pointing to Division Creek plants numbers 1 and 2.

Q. 78. Where did you obtain this map?

Mr. Westall: Counsel for the defendant objects to all these questions relating to this map on the ground that they are incompetent, irrelevant and immaterial, it not being shown what relation either of these plants have to these proceedings.

A. This map I took from the printed report entitled

“First annual report of the bureau of Los Angeles aqueduct power”, dated June 30, 1910, and which map served as a fronticepiece thereto.

Mr. Blakeslee: We offer in evidence the map just produced as Complainant’s Exhibit Q.

Mr. Westall: Counsel for the defendant objects to the receiving in evidence of the map, on the ground that it is incompetent, irrelevant and immaterial. It is further objected to as not being the best evidence, no foundation having been laid for it, it not being fully identified as an accurate representation of the plants and their surroundings which it purports to represent.

Q. 79. By Mr. Blakeslee: Where did you obtain that report?

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial, and not the best evidence.

A. I obtained this report and several others from the office of the Los Angeles aqueduct power department on the 11th floor of the Central building in this city within the last two years.

The Examiner thereupon marks said map as Complainant’s Exhibit Q.

Q. 80. By Mr. Blakeslee: During the last two days have you had occasion to meet anybody in the office of the city attorney of Los Angeles, California?

Mr. Westall: I object to the question as incompetent, irrelevant and immaterial, and having no bearing on any question involved in this case.

A. Yes sir.

Q. 81. By Mr. Blakeslee: With whom did you make that call?

A. I called on Mr. Burnell, assistant city attorney, in company with my counsel, Mr. Blakeslee, yesterday morning.

Q. 82. At that interview do you remember anything being said with relation to inspecting the power plants on the Los Angeles aqueduct known as Division Creek power plant and the Cottonwood power plant?

Mr. Westall: The question is objected to as incompetent, irrelevant and immaterial.

A. Yes sir.

Q. 83. By Mr. Blakeslee: Please state what you recollect as having heard in that connection at that time?

Mr. Westall: The last objection is repeated and the further objection is made that the evidence is hearsay and the question calls for hearsay evidence.

A. Mr. Burnell stated that it had been his intention that every facility be given to Mr. Blakeslee and myself to inspect any and all apparatus in any way involved in this case at any property of the city of Los Angeles.

Q. 84. By Mr. Blakeslee: Was anything done at that time in connection with the consideration of such inspection?

Mr. Westall: The question is objected to as incompetent, irrelevant, immaterial, and having no tendency to affect any of the issues in this case.

A. Mr. Burnell stated that he would transmit the statement above testified to to the newly appointed counsel for the defendant in this case.

Q. 85. By Mr. Blakeslee: Was anything further done at that time in this direction?

A. He dictated a letter in my presence which he stated would be transmitted to the newly appointed counsel, setting forth therein a statement that he had at an earlier date made in these proceedings ^{meet} agreeing that such investigation be fully allowed and facilitated as far as it lay in the power of himself and his office to do, so as to properly and completely arrive at the facts in the case most expeditiously.

Q. 86. To whom was that letter directed, if you recollect?

Mr. Westall: Counsel for the defendant objects to the question as calling for secondary evidence and as incompetent, irrelevant and immaterial.

A. To counsel now present for the defendant, and Mr. Strause.

Q. 87. By Mr. Blakeslee: Was that letter dictated in your presence?

A. It was.

Mr. Blakeslee: In view of the last testimony given by the witness we again reiterate our notice and demand given at this session for full assistance in inspecting any and all plants for the generation of power along the line of or operated in conjunction with or by the water flowing through the Los Angeles aqueduct, and more particularly, as specified, the plants known as Division Creek plant number 2 and Cottonwood plant or Cottonwood Creek plant, all in Inyo County, California.

Mr. Westall: Counsel for the defendant denies that there has been any demand so far made for full assistance

in inspecting or any kind of assistance in inspecting the plants mentioned, and also denies any right, so far as the record here shows, to such an inspection.

Mr. Blakeslee: If there has been any lack of point and directness and strength in the demands along these lines made, they are to be understood as repeated with all such qualities.

Q. 88. Will you kindly refer to photographs, being Exhibits E, to P inclusive, and more specifically point out what they represent, and relate particularly what you witnessed in respect to the construction and operation of any apparatus therein shown pertinent to water wheels, water gates, by-passes, by-pass valves and governors on the occasion of your visit to the Cottonwood power plant and Division Creek power plant number 2 in Inyo County, on the 2nd of January, 1914? In connection with your answer please note in ink upon these photographs briefly the names or designations of the parts or features to which you refer in answering.

Mr. Westall: Counsel for defendant objects to the question as incompetent, irrelevant and immaterial.

A. Referring now to Exhibit E which shows a water wheel unit driving a 750 K. W. generator plant, A indicates the water wheel housing within which operates the water wheel supplied with water from a pipe line extending under the floor, through gate valve B, said pipe line having at its terminal a water gate for varying the flow of water to the water wheel, and in combination therewith a by-pass valve and connections for operating said by-pass inversely to said water gate, which water gate and by-pass are located under the floor plates C.

Said water gate and by-pass are actuated through connections below said floor plate and by rock shaft D and connection E, and Lombard governor F. And said governor having power means for shifting said connection E and D, which power means are set into operation by a controller, which controller is actuated by fly balls G, responsive to the speed variations of the water wheel shaft, through the pulley H and belt, to the water wheel shaft; the water wheel shaft is shown also at I. The shaft also carries the rotating portion, or field of the electric generator, the armature of which is shown at J. The returning devices of the governor are shown by the rod connection K, links and piston rod L, and the clutch in combination with said returning means, which is set into operation by the controller actuated by the fly balls G to prevent the governor "over-running" as shown at M. I will mark corresponding parts throughout these photographs with the same letters.

In this photograph F, D shows the rock shaft actuated by the governor for setting into operation the gate controlling means and by-pass. In this plant the water gate actuated by the governor is what is usually termed a needle valve, which is mounted upon the stem end, said stem extending through the packing of glands supported on the casing O, and having at its other extremity the needle valve for varying the outlet area of the nozzle to proportion the water discharged there through to the load requirements of the water wheel. This water gate stem is actuated from the governor through the connecting lever P, link Q, floating lever R, pin S, thus shifting the valve stem N of the water gate or needle from

the action of the Lombard governor F in photo E, to correct for speed variations. The floating lever R above mentioned is pivoted at the point T and has mounted at its other extremity a connection U to by-pass valve mounted in a by-pass pipe from the main water nozzle pipe, so that as the water gate stem N is moved in one direction the by-pass valve stem connected with U is moved in a reverse direction through the action of the lever R about pivot T. Any movement of rock shaft D, connected with the governor, therefore brings about a corresponding movement in the water gate connected with N, and a reverse movement of the by-pass valve connected at U about the pivot T. I may state that floating lever R is double. That is, it extends on both sides of stem N and connection U and connection Q, and the second portion of this lever is shown in its upper part at V.

Referring now to photo G, F, as before, illustrates the main portion of the Lombard governor, G the element sensitive to speed variations, H the connection to the water wheel shaft, so that G will be sensitive to its speed variations; I represents the water wheel shaft; J represents the stationary portion of the generator; W illustrates the cylinder whose piston shifts the rock shaft D through the connections X, which connections also shift the governor return rod K and clutch mechanism M, set into operation from the controller which actuates W, from the speed element G. Said controller is shown at Y. The power supply for operating cylinder W is supplied by the oil pump Z, operated from the water wheel shaft I by a belt.

DIRECT EXAMINATION (Resumed)

January 16, 1914, A. M.

The Witness: Passing now to the photographs taken at Division Creek number 2 plant on January 2, 1914, by me, and previously testified to, and referring to photograph H, this illustrates the housing containing the water wheel, which I have marked AA; the generator, which I have marked JJ; the governor is pointed to by the arrow BB; the element sensitive to the speed of the water wheel, being fly balls CC, actuated by pulley DD and the belting clearly shown to the water wheel shaft passing between AA and JJ; the upper portion of the controller valve of the governor, which is sensitive to speed variations, is shown at EE; the power means set into operation by said controller valve EE is shown at FF. This is for the purpose of shifting the water gate through the gear connections GG in either direction, under the action of the controller valve EE is shown at FF. This is for the purpose of shifting the water gate through the gear connections GG in either direction, under the action of the controller valve, said water gate being shifted through the rock shaft HH, the connecting rod II, lever KK, rock shaft LL, the water gate being in this plant a valve of needle shape mounted upon the stem MM, connected by lever with the shaft LL, said lever NN being shown in photograph I. There are under the water gate connections OO to the by-pass valve, which, through the action of the lever NN on the rock shaft LL, moves inversely to the movement of the water gate on the stem MM whenever the rock shaft LL is shifted by the rock shaft BB.

The water gate on the stem MM and the by-pass valve on the stem OO are mounted in the nozzle casting PP, supplied with water from connections QQ to the main water supply pipe.

Referring now to photograph I, this being an enlarged photograph of a portion of the apparatus shown in photograph H, it will be seen that QQ is the main for water supply to the nozzle pipe PP, the water gate valve being mounted upon and actuated by the stem MM through the upper portion of the double lever NN, actuated by the lever KK from the balance of the governing apparatus through the rod II. Connection to the by-pass valve is made from the lower portion of the double lever NN through the pin RR, such that inverse movement of the by-pass connections OO and SS and by-pass valve controlling the by-pass outlet of nozzle PP, whenever movement of the water gate and stem MM is made through the rock shaft LL. The water wheel actuated by the flow of water through the nozzle PP under the control of the water gate on stem MM is contained within the housing AA.

Referring now to photograph J, AA is the water wheel housing in which rotates the water wheel on the shaft TT, which drives through belting to the pulley DD to the fly balls CC which are therefore sensitive to speed variations in the water wheel shaft TT; the movement of the fly balls upon a speed change in the shaft TT occasions a shifting of the valve stem VV, carrying the pinion UU, said stem actuating the controller EE, admitting pressure fluid to the cylinder FF, actuating the water gate and by-pass valve in either direction, through con-

nections II, lever KK and rock shaft LL. Movement of the rock shaft LL when affected by the governor causes the swinging of double lever NN which is connected at its upper portion to the water gate stem MM, and at its lower end through connections SS to the by-pass valve, both the water gate and by-pass valve being mounted in nozzle PP which has an outlet control by the water gate for supplying more or less power water to the water wheel, and a by-pass outlet clear of the water wheel controlled by the by-pass valve connected with connections SS. This nozzle is supplied with water from the main pipe line. Through the connections NN, upon movement of the shaft LL, a reverse movement is transmitted between the water gate and the by-pass valve, such that upon the opening of the water gate the by-pass valve moves in a closing direction, and the closing of the water gate causes the by-pass valve to move in an opening direction, thus maintaining the water flow in the pipe line constant during a governing movement. Upon the completion of the governing movement the by-pass valve slowly resumes its normal position under the action of parts shown in photograph I as dashpot OO, springs WW. The governor returning devices are shown on photograph J as XX, and the clutch actuated by the movement of the controller EE for controlling the return of said controller valve EE through the instrumentality of rock and pinion UU, is shown at ZZ. Through the instrumentality of the needle valve this is automatically adjusted during governing movement at YY. The movement of this valve YY automatically is for the purpose of proportioning the

rate of return effected by the oil dashpot on the stem XX proportional to the amount of gate movement demanded from the controller valve EE, actuated from the fly balls CC to meet the necessary speed correction by a greater or less movement of the water gate and reverse movement of by-pass valve, proportioning the water supplied to the wheel to the new load. When a considerable change of load on the water wheel has occurred a considerable movement of the gate valve stem MM is made by the governor, and, through the governor clutch in the returning mechanism shown at ZZ, a considerable movement of the oil by-pass valve YY is made, thus permitting a quicker return of the governor. Whereas if a small change in load on the water wheel occurs, a small movement is made in the clutch ZZ, opening but slightly the valve YY, and thus requiring a longer period proportionally in the return movement, because the oil flowing from one side to the other in the dashpot will take a longer period of time to make the requisite movement through the slightly opened valve YY than where the valve YY has been opened to a greater degree.

This governor action, causing a variable rate of control is shown more clearly in the enlarged portion of the upper part of the governor in photograph K, in which CC, as before, are the fly balls actuated from the water wheel shaft by the pulley DD, causing a movement of the controller stem VV for shifting the controller valve, UU, being the rack and pinion, the shifting of which latter causes a return of the valve stem. YY is the needle valve controlling the flow of oil from one side to the other of the dashpot which I have marked "dashpot",'

which valve YY is automatically opened or closed a greater or less amount by the shifting of the clutch ZZ through connections XX, actuated by controller valve EE.

Photograph L shows at AA the water wheel housing, at TT the water wheel shaft and belting driving to the governor element responsive to speed changes, and shows the water gauge indicating the pressure of water in the supply pipe nozzle and by-pass connections, and which I have marked "Water pressure gauge".

At the time of visiting these plants on January 2, 1914, the ^{second} water wheel unit in the Cottonwood plant was operating and governing automatically with the governor as shown in the photographs E, F and G, and regularly supplying electrical service, the governor operating automatically, the water gate and element responsive to the changes of speed in the water wheel actuating the controller for shifting the water gate in either direction, combined with connections operating inversely to the movement of the water gate and by-pass valve, and means whereby the by-pass valve was returned to its normal position after the completion of a governing movement.

Mr. Westall: Counsel for defendant at this time moves to strike out the testimony after the marking of the various photographs, as not responsive to the question.

Mr. Blakeslee: The attention of the court is called to the fact that the question involved a statement of what witness saw at the plants under discussion, such statement to be given in connection with the discussion of the disclosures of the photographs in evidence.

A. —and a water wheel governor responsive to variations in speed of the water wheel shaft, actuating a controller for shifting the water wheel gate in either direction, and returning means of said governor, and a clutch actuated by said controller and acting to return said controller to its inoperative position so as to prevent "over-running" of the water wheel; and in said water wheel unit a governor responsive to changes of speed in the water wheel shaft, means to set into operation by said speed sensitive means for the purpose of shifting the water gate in either direction, a by-pass and a by-pass valve, controlling said by-pass, connected with said water gate so as to move whenever the water gate is moved inversely thereto.

In visiting Division Creek number 2 plant on the same day, I found there apparatus embodying exactly the same elements, said water wheel, however, not being in operation in supplying current at the time but operatively connected with the pipe line and having water discharging through the by-pass valve. In company with Mr. Alfred H. Dahler I operated the apparatus by hand control, setting into movement the governor and water wheel and water wheel shaft at this Division Creek plant, and actuated the various governor elements, satisfying myself that the action takes place in the various elements exactly as described above in connection with the operating water wheel at the Cottonwood plant and as above mentioned.

While at the Cottonwood plant on January 2, 1914, I also examined the governor on the second unit, which unit was not in operation at that time. The governor

was in all respects an exact duplicate of that operating in connection with the first mentioned unit in this same plant, up to and including the governor rock shaft as shown at X in photograph G, and said governor contained the clutch and operative parts all as shown on photograph K at the Division Creek plant.

Q. 89. By Mr. Blakeslee: You have referred to one Alfred H. Daehler in your testimony. Can you more particularly identify him?

A. Yes; I have met Mr. Daehler before in your office and also on the day of leaving here I met Mr. Daehler through you, and I have since coming here on the present trip seen him several times in your office.

Q. 90. Is he present in this room at this time?

A. Mr. Daehler has just come into the room.

Q. 91. Have you ever made any trip to the Cottonwood power plant and Division Creek power plants concerning which you have testified, other than the trip as to which you have testified in your present deposition?

A. No sir. I visited these plants for the first and only time on January 2, 1914, in company with Mr. Daehler, by an automobile trip from Lone Pine to the several plants, and through Independence, and returned to Lone Pine on the night of January 2nd.

Q. 92. Do you remember meeting any persons at any of the places which you have just referred to?

A. Yes sir; by referring to my notes I can give you the names of several persons. (The witness refreshes his memory with references to these names by reference to his notes.) I met the operator J. E. Baxendale, and Mr. R. P. Rigby, the latter in charge of the Cottonwood

plant. Our chauffeur who took Mr. Daehler and myself to the two plants, was Mr. N. M. Aiguer of Lone Pine.

Q. 93. Were any of these parties whom you have mentioned or any other parties whose names you can recollect, present at the Cottonwood or Division Creek plant or both when you inspected the same, and, if so, who and where?

A. Mr. Baxendale was present during our examination and the taking of photographs at the Cottonwood plant, and Mr. Aiguer was present during a portion of our examination and photographing of Cottonwood and during all of our examination and photographing at the Division Creek plant. Mr. Baxendale gave me this photograph of the interior of the power station at the Cottonwood plant, showing Mr. Rigby in the foreground and showing the two water wheel governors similar to each other to the degree I have previously testified, and which governors form a portion of the governing apparatus and control of the two water wheels shown on the right hand portion of the photograph. The nozzle apparatus controlling these two wheels and actuated by governors and forming therewith a complete governing equipment, is different. The unit in the immediate foreground and which was not in operation at the time we visited the plant, is actuated by what is known as a deflecting needle nozzle.

Mr. Blakeslee: The photograph just referred to by the witness is offered in evidence as Complainant's Exhibit R, Baxendale photo of Cottonwood plant.

Mr. Westall: Counsel for the defendant objects to

the introduction of the exhibit as incompetent, irrelevant and immaterial.

The said photograph is marked by the Examiner "Complainant's Exhibit R, Baxendale photo of Cottonwood plant."

Q. 94. By Mr. Blakeslee: Have you anything further to add to your testimony with respect to what you did when at the Cottonwood and Division Creek plants at the times as to which you have testified?

A. Yes. I made sketches of the elements and details that I have above testified in regard to and which I also photographed. These sketches were for the purpose of making a drawing illustrating fully the manner of operation of the water gates, by-passes, and connections to the balance of the governing apparatus at these two plants.

Q. 95. Can you produce anything which pictures or assists to fix January 2, 1914, as the day you arrived at Lone Pine to inspect the plants under discussion?

A. Yes, sir; I have my Pullman ticket for the night of January 1, 1914.

Q. 96. Where did you buy these tickets?

A. At the Arcade depot in Los Angeles.

Q. 97. Can you produce such tickets?

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial, the witness having already testified that he has been a visitor at the plant in question at the time mentioned.

A. Yes, sir; I have here yellow Pullman ticket 8243 for upper berth 2, car 12, on the night of January 1, 1914, from Los Angeles to Owenyo.

Q. 98. By Mr. Blakeslee: Where is Owenyo?

A. Owenyo is the station beyond Lone Pine. We left the train at Lone Pine, Inyo County, California.

Mr. Blakeslee: We offer in evidence the Pullman ticket referred to as Complainant's Exhibit S, Henry Pullman ticket Los Angeles to Owenyo.

Mr. Westall: Counsel for the defendant objects to the introduction and marking of the exhibit as incompetent, irrelevant and immaterial, there being no evidence connecting the use of the ticket with the particular trip about which the witness has testified.

The said Pullman ticket so offered in evidence is thereupon marked by the Examiner as "Complainant's Exhibit S, Henry Pullman ticket, Los Angeles to Owenyo."

Q. 99. By Mr. Blakeslee: What became of the other part of this ticket?

A. The Pullman conductor took it up, leaving me only the portion which has been put in evidence.

Q. 100. And that was on the trip commencing when?

Mr. Westall: That is objected to as incompetent, irrelevant and immaterial.

A. On the trip commencing from the Arcade depot at Los Angeles on the night of January 1, 1914, and continuing until I left the train on the morning of January 2, 1914, at Lone Pine, Inyo County, California.

Q. 101. By Mr. Blakeslee: Were you accompanied on that same train by anybody?

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial.

A. Yes, sir; Mr. Daehler accompanied me during the whole trip from the time of leaving Los Angeles until after leaving Lone Pine on the night of January 2, 1914,

when Mr. Daehler proceeded to Los Angeles and I to San Francisco.

Q. 102. By Mr. Blakeslee: Can you produce anything farther fixing the day of your inspection of the Cottonwood and Division Creek plants as testified?

Mr. Westall: Counsel for the defendant objects to the question as irrelevant, immaterial and incompetent, having been fully covered by the previous examination of this witness.

Mr. Blakeslee: I take it, then, that the defendant concedes that Mr. Henry and Mr. Daehler were at the said plants at the time and upon the day specified. If that is the case, we will not offer anything further in evidence on that point.

Mr. Westall: Counsel for the defendant does not make any such concession.

A. Yes, sir; I have a receipt from the chauffeur, Mr. Aiguer, who took Mr. Daehler and myself on the automobile trip from Lone Pine, first to the Cottonwood plant and then to the Division plant number 2, and then back to Lone Pine. I paid Mr. Aiguer in the hotel at Lone Pine, taking his receipt therefor, which I herewith hand you and which bears date January 2, 1914, and is signed N. M. Aiguer.

Q. 103. By Mr. Blakeslee: Did you see this receipt signed?

A. I did.

Mr. Blakeslee: We offer in evidence the receipt just produced as Complainant's Exhibit T, Aiguer receipt to Henry of January 2, 1914.

Mr. Westall: Counsel for the defendant objects to the admission in evidence and marking of the exhibit just

offered on the ground that it is incompetent, irrelevant and immaterial.

The said receipt so offered in evidence is thereupon marked by the Examiner as "Complainant's Exhibit T, Aiguer receipt to Henry of January 2, 1914."

Q. 104. By Mr. Blakeslee: You testified just now to the preparation of certain drawings from sketches made by you at the plants in Inyo County under discussion, for the purpose of setting forth in an assisting manner what is shown in the photographs Exhibits E to P, inclusive. Can you produce any such drawings made by you?

A. I can. I have here a drawing illustrating the various nozzle and by-pass parts of the governing apparatus for operating one of the units in the Cottonwood plant to which I have previously testified. As stated above, there were two units in this plant both controlled by what is known as Type R Lombard Governors. One of the units has under the control of its governor what is known as a needle deflecting nozzle. The other unit has under the control of the governor and for operating the water wheel what is known as a governor-controlled water gate or needle nozzle, with an auxiliary by-pass. I have prepared a drawing from my sketches and observations on this latter unit, illustrating the water gate, its operating means, the by-pass and by-pass valve, and its operating means connected with said water wheel gate so as to cause a movement of the by-pass valve inversely to the movement caused in the water gate operating means, and showing the connections for operating these several parts from the governor rock shaft. (Witness produces a line drawing.)

Q. 105. Are the several parts and features shown in this drawing likewise disclosed in any of the photographs in Exhibits E to P inclusive?

A. Yes, sir; they are shown in the photographs.

Q. 106. Will you please indicate upon this drawing the corresponding features which you find in any of said photographs Exhibits E to P inclusive, by the same reference characters?

A. Yes, sir. Referring to photograph Exhibit F, I have now marked upon the said line drawing similar parts with similar letters, as follows: D, the governor-actuated rock shaft; P, lever connection; Q, link connection; R, double lever connection from Q to water gate operating stem N through floating pivot connection S, fulcrum T and by-pass valve connection U. The water supply pipe has cast thereon a receiving branch for the water gate stem N, which branch terminates in the flange O, water being supplied through the said pipe in the direction of the arrow marked "to the water wheel," and through the by-pass connection in the direction of the arrow marked "to by-pass," water being received into said supply pipe from the side as indicated from gate valve B, under the floor plates C, shown on photograph Exhibit E, and which side connection to the nozzle I have shown sketched in ink as a broken pipe connection and marked with an arrow "Water supply pipe leading into side," said water supply pipe thus feeding water through the water wheel, or through the by-pass, depending on the operation of the water gate or needle valve which I have so marked "water gate" or "needle valve" and which is also shown projecting slightly beyond the end of the supply pipe; and the by-pass valve

which I have marked "by-pass valve." Upon any outward or opening movement of the by-pass valve effected by the governor through the connections and lever R to stem U, and at the end of said governor movement, a movement of the by-pass valve in a closing direction takes place at a slow rate of speed, so as not to introduce damaging inertia or ram effects in the pipe line, and to slowly retard the water in the main water supply pipe. This action occurs through the slow movement of the oil dashpot which is connected to the by-pass valve, the piston in said dashpot being mounted upon the rod U, so that a displacement of the by-pass valve toward closing direction may take place without further movement of the rod U, through the by-passing of the oil from one side of the dashpot around the piston to the other side of the dashpot through the adjustably controlled port whose adjusting screws are shown and so marked "adjusting screws."

Q. 107. Will you please mark upon this drawing the name of the plant as to the construction of which this drawing is pertinent?

A. I have marked the drawing "Cottonwood plant water gate and by-pass features operated in conjunction with Type R Lombard Governor."

Mr. Blakeslee: We offer this line drawing in evidence as Complainant's Exhibit U, Henry line drawing of Cottonwood plant water gate and by-pass features operated in conjunction with Type R Lombard Governor.

Mr. Westall: Counsel for the defendant objects to the introduction of the exhibit as incompetent, irrelevant and immaterial.

The said line drawing so offered in evidence is thereupon marked by the Examiner as "Complainant's Exhibit U, Henry line drawing of Cottonwood plant water gate and by-pass features, operated in conjunction with Type R Lombard Governor."

Q. 108. By Mr. Blakeslee: Have you prepared any further drawings from the sketches made by you at the time stated and at the plant stated in Inyo County, purporting to illustrate any of the features of the installations of said plants? If so, please produce same.

(The witness produces another line drawing.)

Q. 109. Did you make this line drawing personally?

A. Yes, sir. I had parts of it prepared in my drafting room and did a good deal of the work on it myself, and all of it was done under my direction.

Q. 110. Is the same true as to Exhibit U?

A. The same is true as to Exhibit U.

Q. 111. Please mark the parts and features of this drawing with the reference characters applied to any similar parts and features shown in photographs Exhibits E to P inclusive.

A. I have marked this drawing as requested by you, and ~~as~~ ^{as} it shows a line drawing the parts which are already illustrated in photographs I and J, the parts which I have marked with letters on said drawing correspond with parts similarly marked with the same letters on photographs I and J, QQ being the water supply pipe connection which feeds water under the control of the water gate for energizing the water wheel, the path of which is shown in the drawing, and also feeds water upon movement of the by-pass valve through the by-pass pipe connection. The path of the water in the by-pass

is clear of the water wheel and under the control of valve mounted with an oil dashpot, the piston of which oil dashpot is connected to the pivots RR by a piston rod, the double lever NN is mounted upon the rock shaft LL, actuated by lever connection KK through connecting rod II. Movement of the power cylinder of the governor FF (see photograph J), HH (see photograph H), causes a movement of the water gate stem MM, causing a movement of said water gate to vary the water flowing onto the buckets of the water wheel and the movement of rock shaft LL, which occasions such movement of the water gate through the double lever NN, shifts inversely to said water gate the by-pass valve, the oil dashpot OO through pin RR. After movement of the by-pass valve by the governor and the completion of governor movement, the by-pass valve is allowed to slowly resume its normal position through the passage of the oil from one side of the oil dashpot to the other around the piston through suitable ports under the control of the adjusting screws shown. I have marked this line drawing "Division Creek plant number 2, water gate and by-pass features."

Mr. Blakeslee: We offer in evidence the line drawing just discussed, as Complainant's Exhibit V, Henry line drawing of Division Creek plant number 2, water gate and by-pass features.

Mr. Westall: Counsel for the defendant objects to the introduction and marking of the exhibit as incompetent, irrelevant and immaterial, as not the best evidence, it not having been shown that the line drawing offered is an accurate copy of any copy of the original sketch made

at the time of the purported visit of the witness at the time and place as to which he has testified.

The said line drawing so offered in evidence is by the Examiner thereupon marked "Complainant's Exhibit V, Henry line drawing of Division Creek plant number 2, water gate and by-pass features."

Q. 112. By Mr. Blakeslee: Can you produce any mechanical showing or embodiment of the features you have marked in the drawings as "dashpot" in Exhibit K and as YY and ZZ and UU, and attendant features?

A. I can. I have here parts obtained from San Francisco agent of the Lombard Governor Company, exact duplicates of those in use on the Lombard governors in the two aqueduct plants.

Q. 113. These features, namely, those shown in the photographs, am I to understand, whatever they are, are exact counterparts in the features in the device you have just produced?

Mr. Westall: Objected to as leading.

A. Yes.

Q. 114. By Mr. Blakeslee: Please, in order that you may state fully as to this, point out any differences, if they exist, between this device and the corresponding device or parts of device as shown in the photographs, and which I have partially referred to, by the use of reference characters and the term "dashpot."

A. There are none.

Q. 115. Will you please now describe the operation of this device, coupling such description or statement with its effect in operation upon any other features of the installations of the Cottonwood and Division Creek

power plants, of which Exhibits E to P inclusive are photographs.

Mr. Westall: Objected to as irrelevant, incompetent and immaterial.

A. With the exhibit of these mechanical parts before me and with that portion carrying the spiral spring at the extreme left with the rack facing me, the connection on the extreme right is to be made to the parts actuated by the controller of the governor, which controller is responsible to the movement of the fly balls, and, therefore, to speed variations in the water wheel. The said connection is through a stem to a piston within the bronze dashpot and for regular operation the receptacle on top of said dashpot, as well as the dashpot itself, is to be supplied with oil. The bronze screw movable up and down, with a stem and valve at its lower extremity, and passing through the cover on the left hand side of the receptacle, is held in a closed position, by a spring in the white metal screwed to said receptacle, at all times when the clutch bearing the raised figures "2974" is in mid or inactive position. This clutch has a separating member, bearing raised figures "2975" from the stationary portion, which carries also a groove in which slides the rack. Any displacement of the rack in either direction within this carrier stationary piece is opposed by the fingers on each end held tightly against their stops by the spiral spring. On movement of the governor mechanism, brought about by the controller valve being shifted by the speed-sensitive devices, movement is therefor transmitted through the mechanical connections to the piston rod and piston of the dashpot, pulling the dashpot, due to the oil being allowed to by-pass very

slowly through it, and, therefore, displacing the rack within its carrier establishing then a spring pressure to restore ~~on~~^{the} the rack to its normal or central position, said spring pressure causing a flow of oil under the control of the adjustable valve in the oil dashpot receptacle. If the governor movement be quick, that is, at a rate faster than the oil will pass around the piston in the dashpot, the dashpot by-pass valve is raised through the spring-actuated rod in the white metal portion, which climbs or is forced up on one of the inclined portions of the jaw or clutch piece 2974, thereby opening to a greater extent the oil by-pass valve, the degree of opening being in a proportion to the degree of movement occasioned in the water gates. The greater the opening thus automatically established by the dashpot oil from the movement of the parts occasioned by the governor control, the faster will said dashpot return, under the action of the spiral spring, the rack to its normal position; and as said rack returns to its central or normal position, the oil by-pass valve is slowly caused to close under the action of the spring in the white metal portion on the dashpot receptacle, so that its movement in a returning direction is more retarded as said rack approaches its normal position. It will therefore be obvious that the rate of return of the rack is automatically controlled from the controller of the governor at a rate automatically adjusted so as to prevent the governor "over-running."

Q. 116. By Mr. Blakeslee: Can you produce any pictorial showing of the parts in the Lombard device just discussed, together with a table naming a means of identification of the several parts thereof?

A. I can. I have here a printed circular bearing half-tone reproductions of the Lombard Type R Governor, in which 33 illustrates a governor, two of which are in use at the Cottonwood plant, about which I have been testifying, and in which the parts 77, 48, 43, 105, 40, 114, 79, 74, are the portions reproduced in the mechanical device I have before me; and in the Division Creek number 2 plant the Lombard governor contains parts as indicated in figure 31 of the half-tone photograph of the Lombard Governor Company's circular, in which figure numbers 43, 81, 83, 74, 82, 40, 105, 104, 77, are the parts of the mechanical device that I have before me.

Mr. Blakeslee: We offer in evidence the Lombard device just discussed as Complainant's Exhibit W, Lombard Governor Device, and also offer in evidence the cuts and descriptive matter just discussed, as Complainant's Exhibit X, Lombard Governor Company illustrative folder of Lombard Governor Device.

Mr. Westall: Counsel for the defendant objects to the introduction of the Exhibits referred to and offered as incompetent, irrelevant and immaterial.

The Examiner thereupon marks the said device so offered in evidence as "Complainant's Exhibit W, Lombard Governor Device," and also the folder so offered in evidence as "Complainant's Exhibit X, Lombard Governor Company illustrative folder of Lombard Governor Device."

January 16, 1914, P. M.

E. F. SCATTERGOOD, subpoenaed as a witness on behalf of complainant, being duly sworn according to law, testifies as follows in answer to interrogatories propounded by Mr. Blakeslee:

- 156 27 insert "Mr. Blakeslee: The present witness
is excused subject to recall for further
examination, in order that the witnesses
subpoenaed at the hour of 2 P. M. on this day
may be at that time examined."
- 157 top of page insert "E F. Scattergood, sub-
poenaed as a witness on behalf of complain-
ant, being duly sworn according to law, testi-
fies as follows in answer to interrogatories
propounded by Mr. Blakeslee."

DIRECT EXAMINATION

By Mr. Blakeslee:

Q. 1. State your name, place of residence and occupation.

A. My name is E. F. Scattergood; I am forty-two years old and I reside in the city of Los Angeles; my occupation is that of an electrical engineer.

Q. 2. Are you connected with the city of Los Angeles at present in any engineering capacity?

A. Yes; electrical engineer in the department of public service, and chief electrical engineer in the power bureau in the department of public works.

Q. 3. How long have those connections existed?

A. I have been doing work in the department of public works since the fall of 1906, I believe; in the department of public service since the fall of 1906, first in a consulting way and since the fall of 1909 in regular employment.

Q. 4. Have you had occasion from time to time during the last year to go over the line of the Los Angeles aqueduct, including that portion of it lying within Inyo County?

Mr. Westall: Objected to on the ground that it is incompetent, irrelevant and immaterial.

A. I have been over most of it within the last year. I have been in Inyo County once during the month of April of last year.

Q. 5. By Mr. Blakeslee: During that month and that visit did you visit any power plants on the line of the aqueduct in Inyo County?

A. No, sir; I did not.

Q. 6. Have you at any time visited those power plants?

A. I have on a number of occasions since my employment with the city.

Q. 7. Can you give the names of any of those power plants so visited in Inyo County?

A. The Cottonwood Power Plant No. 1, and the Division Creek No. 1 and 2 power plants.

Q. 8. I submit to you a map which is marked Complainant's Exhibit Q, and ask you if you have ever seen such a map before.

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. This appears to be a map which I have seen before.

Q. 9. By Mr. Blakeslee: Can you locate upon that map any place to which you have been?

Mr. Westall: The question is objected to by counsel for the defendant as incompetent, irrelevant and immaterial, for the reason that the map has not been shown to be authentic, and for the further reason that the witness has not been properly qualified to testify as to matters inquired about.

A. The location of the Los Angeles aqueduct appears to be indicated by two parallel lines. I have been at one or another time along practically all of the length of the aqueduct except, perhaps, in the western end of the Antelope Valley.

Q. 10. Do you find upon that map the power plants to which you have referred in a previous answer?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial, and as vague and indefinite.

A. The Cottonwood No. 1 plant is indicated here and so marked in its approximate location; the Division Creek No. 1 and 2 plants do not appear on this print in a satisfactory way at all. Their general location is indicated by the words "Division Creek Plant," which I think indicates No. 2, or is intended to, rather than No. 1, which is a little further down stream.

Q. 11. By Mr. Blakeslee: How is the Cottonwood plant indicated on this map?

A. I have already stated that it is indicated as No. 1.

Q. 12. I mean what is the nature of the indication on the map?

A. A rectangular spot.

Q. 13. And any lettering accompanying?

A. "No. 1."

Q. 14. By Mr. Blakeslee: Any names accompanying that lettering?

Mr. Westall: This evidence is all objected to as being incompetent, irrelevant and immaterial to any issue in the present case.

A. The words "Cottonwood Plant" are above it.

Q. 15. By Mr. Blakeslee: Please state in a general way what the nature of your occupation was at the times you visited these plants.

A. My work had to do with advising in regard to the installation of these plants and other electrical works along the line of the aqueduct for the purpose of supplying power for aqueduct construction.

Q. 16. What is the nature of the plants which you have testified to as the Division Creek plant and the Cottonwood plant?

A. They are hydro-electric generating plants, containing water wheels, electrical generators and transformers and other electrical apparatus.

Q. 17. From what source is the water taken for the operation of these water wheels?

A. From Cottonwood Creek and from Division Creek.

Q. 18. And after utilization in these plants where is the water taken care of?

Mr. Westall: That is objected to on the ground it is incompetent, irrelevant and immaterial.

A. The Division Creek No. 2 plant discharges in a concrete spillway or basin which may, in turn, be discharged so as to run back into the creek or into the pipe line of the Division Creek No. 1 plant; and from the No. 1 plant it runs back into the creek. From the Cottonwood plant it was discharged originally from the plant and allowed to run a comparatively short distance across the country to Owens Lake. The last time I saw it, it was arranged to be discharged into the so-called Los Angeles aqueduct.

Q. 19. By Mr. Blakeslee: Does the outflowing water from both of these plants proceed so as to be impounded within any general system of water collection or to supply any source of water utilized in any particular manner?

Mr. Westall: Counsel for the defendant objects to the question as calling for evidence which can have no pertinency or relevancy to any issue in this case.

A. I have already testified in regard to the Cottonwood water passing through the plant referred to. The Division Creek water comes back and along down in a natural channel of the Division Creek, as I recollect it,

which water has been used more or less for irrigating purposes on the Rickey ranch which belongs to the city of Los Angeles—I am not sure whether any part of that water is owned by any other party than the city of Los Angeles or not—and on down toward the Owens River, the Los Angeles aqueduct being between the power plant and the river, so that such water as is wasted might be diverted into the aqueduct.

Q. 20. By Mr. Blakeslee: What means is employed in the Cottonwood plant for controlling the supply of water to the water wheels of that plant?

A. In the Cottonwood No. 1 unit there is what is known as a deflecting nozzle, controlled by a governor, and in which there is inserted a so-called needle which may be controlled by hand. In the Cottonwood No. 2 water wheel unit there is a fixed nozzle in which is inserted a needle and from which the water discharges directly and at all times against the buckets of the wheel, and an auxiliary nozzle connected to the water line a short distance from the main opening already referred to, containing a needle. The needle of the main nozzle is controlled directly by means of the governor. The needle of the auxiliary nozzle is controlled in large part by means of springs. It may be controlled by hand, as I recollect. And, indirectly, and on very rarely occurring occasions, it is controlled in a degree by the governor. It is connected to the governor through a hydraulic cylinder, the action of which in effect is to nullify the effects of the governor, except a partial control on rare and exceptional occasions in unusually sudden shutting down of the flow of water to the main nozzle.

Q. 21. Is that connection for taking care of such ex-

treme fluctuations always maintained in this installation?

A. The normal condition is that it would be in readiness to operate under such conditions as I have described.

Q. 22. What is the nature of the means controlling supply of water to the wheel of the Division Creek plant?

A. It is similar to the means described supplying the Cottonwood No. 2 unit. There is but one unit in the Division Creek plant.

Q. 23. In these units which employ the main needle and the auxiliary needle, how many nozzles are there?

A. My testimony has been full in regard to that. There is a main nozzle discharging the water onto the wheel, and an auxiliary nozzle. Two in all.

Q. 24. And these needle control respectively these nozzles?

A. Yes, sir.

Q. 25. In each of these two-needle and two-nozzle installations what is the relation between the two needles with respect to controlling the flow of water through the respective nozzles?

Mr. Westall: The question is objected to as vague and indefinite.

A. There is no relation whatever that can be described, except in the instances which I have already described in case the needle of the main nozzle closes the orifice with unusual rapidity,—which may occur in rare instances in such plants—the auxiliary nozzle orifice will be opened somewhat momentarily by the inter-connection through the hydraulic cylinder, and immediately

start to close, and in a very short space of time completely close, due to the operation of the springs in conjunction with the hydraulic cylinder.

Q. 26. By Mr. Blakeslee: What is the result of this operation of the auxiliary needle in conjunction with the sudden closing of the main needle?

A. The result is to prevent dangerous rise of pressure which might endanger the pen stock line or, at least, that is the intended result.

Q. 27. What occurs at this juncture with respect to speed of water wheel rotation?

A. I cannot undertake to answer that question, because the speed of water wheel rotation depends upon the load conditions and other conditions, and would be erratic and uncertain at such a time, and such uncertain condition is the very cause of these unusual conditions referred to as to the closing of the nozzle.

Q. 28. Assuming there is a diminishment of load in this unit, or, we will say, a sudden diminishment of load, what occurs with respect to the volume of water passing the main needle for projection against the wheel buckets?

A. That would be decreased by the action of the needle directly controlled by the governor, in order to suit the amount of water to the remaining load.

Q. 29. And when the auxiliary needle coincidentally acts under these circumstances, what is the effect produced upon the speed of the volume of water passing the needle?

Mr. Westall: Objected to on the ground that the witness has not testified that the auxiliary needle coinci-

dentally acts. It is assuming an action which has not been shown.

A. On all occasions with this mechanism, in which there is a change of load resulting in a closing or opening of the orifice of the main nozzle, that is, a partial closing or opening, there is a corresponding rise in the pressure in the pen stock line or lowering of pressure in the pen stock line, and there is a corresponding increase in velocity in the water projected from the main nozzle, or a corresponding decrease in the velocity of the water. The auxiliary device does not prevent those changes in velocity. The only instance in which the auxiliary device comes into play is when the closing of the orifice to the main nozzle is at such rate as to cause such rise of pressure, were it not for the auxiliary device, as to cause possible damage to the pen stock line. To that extent there would be a lesser increase of velocity of the water ejected from the main nozzle than would otherwise be the case, but, nevertheless, a very material increase in the velocity of water.

Q. 30. By Mr. Blakeslee: Would you or would you not say that the extent of the diminishment of the velocity of the water under the conditions assumed in the last part of your last answer, upon the opening of the auxiliary nozzle, was a matter of degree dependent upon the responsiveness of the auxiliary needle, that, in turn, dependent upon the adjustment or state or strength of the controlling device thereof?

Mr. Westall: Counsel for the defendant objects to the question as calling for the opinion of the witness, the witness not having, so far as this record has disclosed, qualified to testify as an expert.

A. There is some room for adjustment one way or another, but not to such an extent as to alter the force of my former statement. The intent of this device, as claimed by the manufacturer and called for and desired by the city's engineers in purchasing such devices, was merely to protect the pen stock from excessive pressure, and not for the purpose of securing perfect governing, it being the intention that the governor should take care of such increases and decreases in the velocity of water ejected from the main nozzle as would not correspond to a dangerous rise in pressure. A device which would be such as to make possible an increase in flow in such auxiliary device, corresponding to a decrease in the flow of the main nozzle, was not to maintain the velocity from the main nozzle constant, or such as to provide or make possible a decrease in flow corresponding directly to an increase in flow in the main nozzle so as to avoid a decrease in the velocity of water ejected from the main nozzle, would require that at all times the total flow from the two nozzles be equal to the maximum flow from the main nozzle. The desire and purpose of the city's engineers in buying the devices, and the effect of these devices, is exactly the opposite of that, in that water is economized, and when there is no flow from the main nozzle there is no water passing, and the flow at all times of the water is approximately proportional to the load, except momentarily on such rare instances as I have referred to on several occasions in this testimony.

Q. 31. What have you to say with respect to the variation of the inertia effect of the column of water in the

pen stock or supply pipe, responsive to the action of this auxiliary needle?

A. I have stated that fully already, if I understand the import of your question, in that the momentary opening of the auxiliary nozzle, in the event of unusually rapid or sudden closing of the orifice of the main nozzle, a rise in pressure in the pen stock line at or near the water wheel is lessened to some extent, the intention being that it should be lessened to such an extent as not to be such as to be objectionable from the standpoint of the liability of the pen stock line.

Q. 32. If this auxiliary needle and nozzle were eliminated, would or would not there be a difference in velocity of water flow past the main needle upon moving the same toward closing position, resulting in a difference of velocity of the water wheel in rotation during governing action?

A. There would be and there is at all times, as I have already stated. The effect of the auxiliary device occurs simply in rare instances in which the closure is unusually rapid, and to prevent that increase going beyond a certain point—that is, the increase of pressure in the pipe line—and to that extent it affects the possible increase which might otherwise appear in the velocity of the water corresponding to the additional increase of pressure which would under those circumstances occur.

Q. 33. Then am I correct in deducing that the extent of service of the auxiliary needle and nozzle are dependent upon the extent of operation of the governing device, which is, in turn, controlled by the extent of fluctuation of load upon the water wheel?

A. Altogether upon the rate of that fluctuation. At ordinary rates of fluctuation of load, the auxiliary nozzle has no effect whatever, and it is only in case of sudden decreases in load that its effect occurs, and the effect in preventing increases of pressure in the pipe line and increases of velocity of the ejected water from the main nozzle is only partial.

Q. 34. Did you assist in or superintend personally the setting up and installation of these water supply and water supply-controlling devices at the Cottonwood and Division Creek power plants?

A. I was not in executive charge in the work of installing those plants. As I recollect, I was in executive charge of the operation of some of the power system and telephone system for some several years. But, in any event, I had to do with the preparation of the specifications on which they were purchased, and advised in regard to their installation.

Q. 35. Do you remember when both of these plants with the governing devices were installed?

A. I believe they were both installed in the year 1909, one in the early part of the year and one in the fall.

Q. 36. Do you remember from whom they were purchased?

A. The Abner Doble Company.

Q. 37. Of what place?

A. San Francisco.

Q. 38. Now, these cylinders to which you have referred and which affect the operation of the auxiliary needles, please state what comprises the main features thereof.

A. The main features of the hydraulic cylinders referred to are the usual cylinder body of cast iron, I believe, and a piston, and a piston rod passing through the center of one of the heads of the cylinder. There is a check valve in the piston itself, as I recollect, of such capacity as to nullify the connection between the governor and the needle of this auxiliary nozzle entirely when the governor is opening the needle of the main nozzle the fluid passing through unobstructed, in effect. And there is a smaller orifice which is not of such capacity so as to allow it to freely flow back and forth, but which comes into play when the action of the governor is reversed. That is closing the needle of the main nozzle.

Q. 39. What fluid is used in that cylinder, opposed to the motion of the piston?

A. Oil, I believe.

Q. 40. And the passage through which the oil passes, as I take it, from side to side of the piston, is that controlled as to capacity in any manner?

A. The larger orifice referred to, if not the smaller orifice, can be adjusted to some extent. I could not testify as to exactly what extent.

Q. 41. Would or would not that affect the responsiveness of the cylinder device with respect to predetermined thrust upon the piston rod?

A. That would affect the degree to which the action of the governor would be transmitted to the needle of the auxiliary nozzle. But the device is intended and has at all times been used in a way to produce results such as I have heretofore described.

Q. 42. When you say the device has always been

used in such and such a manner, do you mean by yourself or under your direct control, or at all the times when you were not in personal attendance?

A. At all times, to the best of my knowledge and belief. That is, that has been the purpose.

Q. 43. Who is at present in charge of the Cottonwood plant, if you know?

A. I do not know who has immediate charge at the present time.

Q. 44. Do you wish to differentiate at all between the Cottonwood plant and the Division Creek plant with respect to the testimony you have given relative to the nature of operation and effect of the auxiliary needle and its nozzle, and the governor, on the main needle and its nozzle, broadly speaking?

A. Not unless it is this way: That in installing the Cottonwood unit we were desirous of having a mechanism which would result in the saving of water, because the plant was used for construction purposes in the aqueduct, and while we had very little, or comparatively little, capacity in the ditch approaching the forebay and in the forebay, still it amounted to a great deal in toto as the total power which we could secure. The pen stock line at Cottonwood is about half the length of the line at Division Creek. There are two units at Cottonwood, so that the governor and main nozzle in their operation affect but one-half of the capacity of that pen stock line. So that we were not very particular about, and it is doubtful in my mind, as to whether this auxiliary device has ever been needed or of any value in that plant. I cannot testify that it is, and I could not testify positively that

it is not. I am satisfied that the conditions are such that there would not be any such severe pressures resulting, in all probability, as to damage the pen stock line. In the Division Creek line there is but one unit, and the pen stock line is, as I say, twice as long, and there was need of such a device. As to whether that device has ever been of value to the city I cannot say. I do know, though, seeing the results and being told by those there at the time, the results of the governor having shut down suddenly on one occasion, the device did not on that occasion protect the pen stock line. It opened up and suddenly there was a collapse, to a considerable extent, partially, more or less along a considerable distance at the upper end, the opening being down near the power house.

Q. 45. Do you know of any other such occurrences during the four years that the plants have been in use? *fi*

A. Not that resulted in immediate damage.

Q. 46. And at any time during those four years have these auxiliary needles and nozzles been discarded or disconnected so that they were not used during the operation of the main needle?

A. I do not know that they have been disconnected. The plants have not been run all the time.

Q. 47. Are these two units at Cottonwood always simultaneously used, or the contrary?

A. Sometimes they have been used simultaneously, but much the greater length of time during the operation of the plant there has been but one unit running at a time.

Q. 48. Are or not those plants or either of them at present in use for the generation of electrical energy?

A. There is one of the three units that we are referring to in these two plants running practically all the time.

Q. 49. What consumption is supplied by this last plant as now operated?

A. At the present time the small amount of energy supplied for the use of the city of Los Angeles from time to time in connection with its aqueduct. The most of the electrical energy supplied by that at the present time is supplied to the inhabitants in the southern end of the Owens Valley for their accommodation. It is practically at cost, as nearly as we could predict, and in response to their repeated requests for such service.

Q. 50. I hand you a printed piece of paper and ask you if you know what the subject matter is.

A- It is an application blank for lighting which is provided by the city for use in the town of Independence and of Lone Pine and immediate vicinity.

Q. 51. Those towns being in what county in California?

A. Inyo County.

Mr. Blakeslee: We offer in evidence the printed sheet just referred to by the witness, as Complainant's Exhibit Y, Los Angeles city application for lighting blank, form 156, and ask that it be so marked.

Mr. Westall: Counsel for defendant objects to receiving in evidence and marking of the paper referred to on the ground that it is incompetent, irrelevant, immaterial, and could not possibly affect any issue in this case.

Q. 52. By Mr. Blakeslee: I show you a number of photographs, being respectively Complainant's Exhibits

E to P, inclusive, and I will ask you if you recognize the showing of any of the same, and, if so, to please state in connection with each, briefly, what the illustration is. In so doing I will obscure the identifying wording appearing upon each.

A. That appears to be a photograph showing part of unit No. 2 in the Cottonwood plant, and in a large part the direct current exciter generator and water wheel driving the same, to which no reference has heretofore been made by me.

(The witness in this answer referring to Complainant's Exhibit E.)

A. I do not know that I can positively identify that (re-ferring to Complainant's Exhibit F). This, referring to exhibit G, undoubtedly is a picture showing one of the hearings and a portion of the governor and a small portion of the governing mechanism of the No. 2 unit in the Cottonwood plant.

Complainant's Exhibit H, I think, is undoubtedly the remaining portion of the governor and governing mechanism, and a small portion of the frame of the water wheel and generator at Division Creek No. 2 plant. That is the plant to which all my testimony has been referred. I have not described or testified in regard to the No. 1 plant except as to its existence and the water leading to it from the No. 2 plant.

Complainant's Exhibit I, I cannot say positively, but I think it is a more detailed photograph of the Division Creek No. 2 plant—of a portion of the governing mechanism.

Complainant's Exhibit J, is a view of the water wheel

and a portion of the governor and the governing mechanism of the Division Creek No. 2 plant.

There is nothing in that Complainant's Exhibit K that I can positively identify.

Q. 53. I call your attention to Exhibit J in connection with Exhibit K, and ask you if you can identify Exhibit K?

A. Exhibit K appears to be a detail of the same from J.

Complainant's Exhibit L appears to be a detail again from J.

Complainant's Exhibit M is a view of the Cottonwood power house.

Complainant's Exhibit N is another view of the same place.

Complainant's Exhibit O appears to be an electric dredge located in the open canal portion of the Los Angeles aqueduct in the Owens Valley.

Q. 54. From what source did it receive its electrical energy?

A. From these three power plants in combination.

Q. 55. Cottonwood and Division Creek?

A. One and two. Complainant's Exhibit P is a view at Division Creek No. 2 power plant.

Q. 56. Am I correct in understanding that all of these exhibits E to P which contain showings of power plants are the power plants to which you have previously testified, being in Inyo County, California, on the line of the Los Angeles aqueduct?

A. Yes, sir; on or near the line of the aqueduct.

Q. 57. I will ask you to produce a rough sketch in

outline illustrating one of the main nozzles and its needle, and one of the auxiliary nozzles and its needle, and connections between such needles and the governor, as being an embodiment, roughly, of your testimony as to the construction and installation of these parts, as embodied in the plants at Cottonwood and Division Creek power plants.

Mr. Westall—Counsel for the defendant objects to the question as irrelevant, immaterial, incompetent, and as having been fully covered in previous questions and answers of the witness.

A. Will you tell me what you want me to show? I think the proposition is quite unreasonable and unprofitable.

Q. 58. By Mr. Blakeslee: I want simply a paper which will reflect your testimony and which the Judge can look at. I will add this, however. In this connection I submit to you complainant's exhibits U and V, and ask you to inspect same, and if you find that you can refer to these or either of these and the parts thereof so as to answer the question without physically producing a sketch, you are at liberty to do so. And I will further state that in this question I am not asking that you reproduce or designate or indicate a reproduction of any specific details, but only the general provision and interrelation of parts and features.

Mr. Westall: Counsel for the defendant object to the request and the question asked on the ground that the matter has been thoroughly gone over and it has only the effect of incumbering the record with matters which have been heretofore thoroughly covered.

A. I cannot very well use those exhibits for the reasons that the names on either do not correspond to the names I have used in the testimony and the usual terms referring to the parts of this mechanism. I have been very free and full in my testimony and as accommodating as I can be in giving expression to the truth, and I cannot see how I can draw any sketch that would be of any benefit, and I prefer very much not to undertake it.

Q. 59. By Mr. Blakeslee: Referring to exhibits U and V, will you kindly point out any variation from such showing existing between the corresponding installations at the Cottonwood and Division Creek plants and such sketches, as to the general construction and inter-relation of parts and features?

A. I think I can say in regard to Exhibit V, the general relation here between what appears on the sketch as the upper nozzle is what I have referred to as the main nozzle, and on which is written in ink "To water wheel." The needle which is within this nozzle is referred to here as a water gate. That is, the pointed end of the needle which actually enters and closes the orifice. The lower portion of the sketch shows the hydraulic cylinder to which is connected from the line a bell crank which, in turn, is connected up to the shaft from the governor above and to the left, and this dash pot in turn is connected to the end of the needle in the auxiliary nozzle which is the other portion of the lower part of the sketch, the body of the hydraulic cylinder being connected to the stem of the needle, apparently, in this sketch, and the piston rod leading to the piston then being connected to the left towards the governor. The portion of this needle

which enters and closes the orifice or outlet from this auxiliary nozzle is marked here "By pass valve." Those terms "water gate" and "by pass valve" are not usual, to the best of my knowledge, as applying to this mechanism, and are not the ordinary engineering terms as applied to such devices, as I understand it.

Q. 60. Would the term "needle valve" come more within your approval as to the parts marked "water gate" and "by pass valve"?

A. That is half correct, in accordance with my idea. It is a nozzle, and a nozzle is a mechanism which has a definite meaning. That is, the term "nozzle" has a definite meaning in engineering. It is a mechanism formed for the purpose of ejecting water efficiently and to advantage from an engineering standpoint. This is a combination of a needle and a nozzle, or a needle nozzle, and not a needle valve nor a water gate nor a by-pass valve. It is improperly termed, according to my ideas of such terms.

Q. 61. And the needle and the nozzle in cooperation constitute, do they not, a controlling valve?

A. The nozzle is formed so as to eject the water and impart it, as it were, to the wheel; and the needle is inserted for the purpose of varying the amount of opening of the orifice or wholly closing it or leaving it wholly open for the purpose of controlling the flow of water or the amount of that flow.

Q. 62. So the nozzle, as you may say, is a self-contained ~~water~~ ^{valve} device? Is that correct?

A. Well, there is a shut-off gate or valve for the gate type which is supplied and shows in one of those ex-

hibits which I have identified as of the Division Creek unit, for the purpose of the ordinary function of a valve or gate. These mechanisms, that is, these needle nozzles, have their specific functions. I would like to speak more of the mechanism marked WW, which is one of the portions of the springs which in large part controls the actions of the auxiliary nozzle, there being a similar spring on the opposite side of the hydraulic cylinder.

Q. 63. Generally speaking, what is the function of those springs last referred to?

A. To close the orifice of the auxiliary nozzle and keep it closed, except on such rare occasions as have been referred to.

Q. 64. That is to say, close that valve after the governor action. Is that correct?

A. To close that valve after that governing action on those rare occasions that I have referred to, and keep it closed at all times during governing action except in those unusual instances of unusually sudden shutting down of the flow of water from the main nozzle.

Q. 65. Does or does not the testimony which you have just given in the last few answers refer generally to the nozzle and governing devices present in both the Cottonwood and Division Creek power plants?

A. My testimony, as referring to the sketch on Exhibit V, in answer to your question in regard thereto, would in principle apply equally to unit No. 2 in the Cottonwood and in Division Creek No. 2 plant. You will notice that that spring on that hydraulic cylinder and the function of the two act in conjunction with the operation of the governor to produce the results that I have

referred to, and necessarily prevent corresponding increases and decreases in the flow in the auxiliary nozzle with the ordinary decreases and increases in the main nozzle; and the auxiliary nozzles are not large enough to function in such a way as to prevent any change in the total flow of water or any change in the velocity of water ejected from the main nozzle, even though these spring and hydraulic cylinder devices were eliminated, and an appropriate direct connection of the governor substituted.

Q. 66. Referring to complainant's Exhibit I—to the photograph—I will ask you if you can identify what the parts referred to as PP and QQ are?

A. PP and QQ are branches at the lower end of the main nozzle, PP being a branch from which the stem of the needle comes out to the open through a packing gland, and QQ being a branch from the end of the pen stock proper to the nozzle casting.

Q. 67. Can you state what the parts designated as LL and KK are on this drawing, Exhibit I?

A. LL seems to be a shaft on which certain bell cranks are keyed and which turns in fixed sockets or bearings through small annular motions. KK is a bell crank keyed to the shaft LL and from which the shaft leads off to the left towards the governor, and, I believe, connects with the governor, being marked II.

Q. 68. Can you state the type of governor device which is used in these Cottonwood and Division Creek plant installations?

A. In the Cottonwood plant the governor is a Lombard governor primarily. That is, the governor mechan-

ism proper. It is of the vertical type. And in the Division Creek plant there is a similar governor, but of the horizontal type.

Q. 69. Do you see before you on the table any example of either of these types of Lombard governors?

A. Do you refer to this piece of mechanism? (Exhibit W).

Q. 70. I do if you do.

A. This looks to me as if it were a similar governor.

Q. 71. Of which type?

A. Of the Lombard type.

Q. 72. I mean as part of which kind—horizontal or vertical?

A. I don't believe I can tell.

Q. 73. That is the same type of Lombard device, is it, or is it not, used in both of those plants?

A. The governors as to their general functioning and mechanism resulting in such functioning, are similar.

Mr. Blakeslee: The witness picks up and refers to Complainant's Exhibit W.

A. I cannot testify that this is exactly like a similar mechanism on those governors, either one of them.

Q. 74. But this is what would be understood in the trade to be of a similar type of Lombard governor to those on the plants up there, or is that not so, or as to the parts thereof shown in this Exhibit W?

A. I think so.

Mr. Blakeslee: You may cross-examine.

Mr. Westall: The cross-examination will be waived,

C. A. HEINZE, a witness subpoenaed on behalf of Complainant, and being first duly sworn, deposed as follows in answer to interrogatories put by Mr. Blakeslee.

DIRECT EXAMINATION

By Mr. Blakeslee:

Q. 1. Please state your name, age, residence and occupation.

A. My name is C. A. Heinze; age, 30; occupation, electrical engineer; residence, Los Angeles, California.

Q. 2. With what interests are you at present associated or employed?

A. The city of Los Angeles.

Q. 3. Have you had anything to do with the installation or management of any of the electrical features of the Los Angeles aqueduct?

A. I was on construction work and operation work on the Los Angeles aqueduct, both in an auxiliary and direct charge of operating work.

Q. 4. For what period of time?

A. In the neighborhood of two years.

Q. 5. What years? The last two years?

A. No; the latter part of 1907 to the latter part of 1909.

Q. 6. Over what portions of the Los Angeles aqueduct did your service extend during these years?

A. The Owens Valley.

Q. 7. And at what places in particular?

A. Cottonwood and the Division Creek power plants.

Q. 8. These are located where?

A. Inyo County, California.

Q. 9. I hand you a map, being complainant's exhibit Q, and ask you ^{if you know} what that map shows.

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial,

and calling for not the best evidence, there being no showing that the map introduced is accurate or correctly represents what it purports to set forth.

A. It represents in a general way the county traversed by the Los Angeles aqueduct.

Q. 10. By Mr. Blakeslee: Do you find noted or located thereon the plants to which you have just referred, and, if so, please state how they are indicated.

A. The approximate location of the plants, as I have named, is given. They are marked "Division Creek Plant" and "Cottonwood Plants."

Q. 11. What is the nature of these plants?

A. Hydro-electric plants.

Q. 12. By what means is the flow of water to the wheels controlled in these plants?

A. By governor.

Q. 13. And this governor is of what general type, as to any essential part thereof?

A. To which governor do you refer?

Q. 14. The governor in either of these plants.

Mr. Westall: I object to the question as vague and indefinite, not specifying what counsel considers the essential parts thereof.

Q. 15. I will withdraw the question and put it as follows: Please describe briefly the nature of either of these governors.

A. That is, just the governor itself?

Q. 16. I am replying to the language that you used.

A. The governor at the Cottonwood power plant is what is known as the oil pressure type governor, self-contained, of the vertical type.

Q. 17. And as the Division Creek plant?

A. The Division Creek plant is what is known as the hydraulic type, and differs from the Cottonwood type in some particulars, the main one of which is that it uses water instead of oil, and that it is the horizontal type instead of the vertical, and is not of such a self-contained nature.

Q. 18. In what manner or through what general leading features of installation does this governor control the flow of water to the wheel in each plant?

A. To which plant do you refer?

Q. 19. Each plant.

A. It controls the water by means of a needle nozzle the gates of Division Creek plant. The gates at Cottonwood, the No. 1 unit, it controls by deflecting nozzle, and the No. 2 unit is controlled by a needle nozzle.

Q. 20. ~~It is~~ It is a single needle nozzle in each instance?

A. Not in every case.

Q. 21. How many nozzles are there in some cases?

A. In some cases there are two nozzles.

Q. 22. How many needles are there where there are two nozzles?

A. There are two needles.

Q. 23. How do these operate?

A. One connected directly to the governor and the other indirectly to the hydraulic cylinder connection.

Q. 24. Do both of these nozzles direct water upon the wheel?

A. No; only the main nozzle.

Q. 25. And how is the other nozzle used?

A. Used as an auxiliary nozzle.

Q. 26. And for what purpose?

A. This auxiliary nozzle is used to prevent excessive pressure accumulating in the pipe line due to a sudden closing of the main needle. In other words, to act to protect the pipe line.

Q. 27. How do these needles in the respective nozzles of each installation operate relatively?

A. The main nozzle operates to vary the water in proportion to the load changes. When these changes are gradual, they have no effect upon the auxiliary nozzle, which operates only in case the main nozzle attempts to close faster than a certain pre-determined rate, when it opens to relieve the pipe line.

Q. 28. What causes the closing of the auxiliary nozzle through its needle?

A. Springs.

Q. 29. And this closing takes place when?

A. After the needle is open.

Q. 30. And when with relation to the governing action of the main needle and nozzle?

A. It has no connection with the main needle and nozzle. It operates just as fast as the hydraulic cylinder which control it allows it to operate.

Q. 31. And after it has been opened during the closing action of the main nozzle needle?

A. Do I understand you to ask if it closes after the main needle has closed?

Q. 32. Does it close after it has opened in conjunction with the closing or closing movement of the main needle?

A. Its closing is governed entirely by the action of

the hydraulic cylinder upon the spring, and closes at a certain pre-determined rate, according to the way in which the hydraulic cylinder is set. After the nozzle is once open it is entirely separate and distinct from the main nozzle and closes on account of its own mechanism.

Q. 33. What I understand from your previous testimony is, the auxiliary needle opens conjointly with the closing of the main needle. Is that correct?

A. Only on rare occasions.

Q. 34. But that is true whenever it opens, is it not?

A. Yes, sir; through the hydraulic cylinder.

Q. 35. And that cylinder or the part playing therein causes the opening of the auxiliary needle under and responsive to the governing action of the main needle, does it not?

Mr. Westall: Counsel for defendant objects to the question as leading.

A. Indirectly; yes.

Q. 36. By Mr. Blakeslee: Please state how this cylinder acts to open the auxiliary needle or move it from closed position in the closing action of the main needle.

A. The hydraulic cylinder is a cylinder, as its name implies, and has a piston in it which, in turn, has a check-valve in it of a certain size to allow a free movement in one direction but in the opposite direction it has to force the oil which the cylinder contains through a small orifice. It has a certain pre-determined rate of outflow, and whenever the pressure exerted upon the piston is such as to cause it to move faster, the oil can be discharged through this orifice which causes it to move the auxiliary nozzle.

Q. 37. And what is taking place at this time with respect to the main needle?

A. The main needle is closing faster than a certain pre-determined rate.

Q. 38. And when this auxiliary needle opens what effect does it have on the velocity of water passing the main needle?

A. In what way do you mean, have an effect upon the velocity at the main needle?

Q. 39. Please read the question. (The Examiner reads the question.) Did you understand the question?

A. I don't know as I understand exactly what you mean.

Q. 40. I will re-state it. When the auxiliary needle is moved away from closed position, as you have testified, what effect does that operation of the auxiliary needle have upon the velocity of water passing the main needle?

A. That is, considering after the main needle is open?

Q. 41. If it is not I don't suppose any water can pass it.

A. The opening would tend to decrease the pressure at the main nozzle.

Q. 42. And how as to the velocity resultantly?

Mr. Westall: Counsel for defendant objects to this line of questioning on the ground that, so far as the record here discloses, this witness has not been qualified as an expert to testify as to the internal operation of these devices.

A. I should think that the velocity would be increased momentarily.

Q. 43. By Mr. Blakeslee: For what reason?

Mr. Westall: That is objected to as being matter of mere speculation on the part of the witness, and purely a matter of opinion for which he has not been properly qualified in this record.

A. I am not able to state.

Q. 44. By Mr. Blakeslee: Have you noted the operation of these nozzles and needles at the Cottonwood and Division Creek power plants?

A. I have.

Q. 45. How recently?

A. Not since 1909.

Q. 46. And at that time did your attendance at the plants come within the province of your duties on behalf of the city of Los Angeles?

A. It did.

Q. 47. Now, when the auxiliary needle leaves its seat or tends to open the auxiliary nozzle, what is the effect with respect to the volume of the flow of water through the auxiliary nozzle?

Mr. Westall: To which question counsel for the defendant renews his objection on the ground that the witness has not been properly qualified. The question is further objected to as calling for matter purely speculative.

A. Am I to understand that you want the volume of water when the needle leaves its seat?

Q. 48. By Mr. Blakeslee: Yes. What is the effect on the water passing the nozzle as it goes away from the seat.

A. It increases. The flow increases.

Q. 49. Where does such flow come from?

A. It comes from the main pen stock.

Q. 50. Where does the flow passing the main needle come from?

A. The penstock.

Q. 51. Now, I will ask you again to state what would be the effect upon the velocity of the water passing the main needle when the auxiliary needle moves away from its seat?

Mr. Westall: Counsel for the defendant renews his objection heretofore noted as to the immediately preceding question.

A. The velocity tends to increase.

Q. 52. By Mr. Blakeslee: And is that due in any way to the subtraction of water from the total amount in the main pen stock resulting from the passage of part of that water through the auxiliary nozzle?

Mr. Westall: The same objection.

A. Indirectly; yes, sir.

Q. 53. By Mr. Blakeslee: Supposing the auxiliary needle remained closed. What would be the effect upon the amount of water passing the main needle, with relation to the amount passing the main needle with the auxiliary needle unseated or in open position?

Mr. Westall: The objection heretofore noted is repeated, and it is further objected to as vague and indefinite.

A. I don't get a clear conception of the question.

Q. 54. By Mr. Blakeslee: I cannot put it any clearer. You can have it read as much as you want.

A. All right; read it again. (The Examiner reads the question.)

Q. 55. By Mr. Blakeslee: Take your time. I do

not want to hurry you at all. I do not want to hurry you or to confuse you. (The Examiner again reads the question.)

Mr. Westall: Counsel for defendant suggests and calls attention to the fact that the question has been read three times, and that it is vague and indefinite, and suggests that counsel put his question in some form that will be intelligible.

Mr. Blakeslee: We do not care for any suggestions from counsel; and if he is not able to understand the question, that is his loss. We are asking this question to be answered and the question is perfectly intelligible.

A. May I ask for information?

Q. 56. By Mr. Blakeslee: Yes, sir.

A. Do I understand the conditions are that the auxiliary nozzle is closed, and that you want to know what the condition will be in case the main nozzle is open as compared with its condition when the auxiliary nozzle can help it out during its movement?

Q. 57. Being open, yes. As compared with the condition when the auxiliary nozzle is open and the main nozzle is open.

A. Do you want a statement from me as to the condition of the velocity of the water in the pipe line?

Q. 58. The amount of water flowing.

Mr. Westall: The same objection to the explanation of the question is repeated as to the main question.

A. In the case of a nozzle without an auxiliary attachment on it, if the nozzle was closed the amount of water, of course, would be on the decrease. In case of the nozzle with the auxiliary attachment, if the main needle was closed and the auxiliary nozzle open, the

amount of water would be slightly on the increase momentarily and would gradually drop back to a point below which the main needle had opened previously.

Q. 59. By Mr. Blakeslee: Now, let us assume that the main needle is part way open and that the auxiliary needle is closed. Consider this as the first proposition. Let us further assume that the main needle is partly open and the auxiliary needle is open. Consider that as the second proposition. Now, would or would there not under these propositions be a variation of the velocity of water passing the main needle, assuming that the same head in the pen stock is maintained.

Mr. Westall: The same objection as was made to the previous question is here repeated, namely, that this witness has not been properly qualified as an expert and that the evidence called for is purely speculative.

A. As I understand, you have one case where the main nozzle is open and the auxiliary nozzle is closed. The second case is with both nozzles part way open. And you want to know the velocities—

Q. 60. By Mr. Blakeslee: The relative velocities.

A. Considering the main needle in each case—

Mr. Westall: It is further objected to as incompetent, irrelevant and immaterial to any issue in this case.

A. Momentarily the velocity would be greater in the case of both nozzles being open.

Q. 61. By Mr. Blakeslee: Assume that the auxiliary nozzle with both nozzles open, subtracted 80% of the flow of water passing through the main nozzle normally. Would the velocity at the main nozzle be greater or less with such 80% subtracted?

Mr. Westall: Counsel for defendant repeats the objection heretofore noted.

A. I don't know.

Q. 62. By Mr. Blakeslee: Would there be a difference in velocity?

Mr. Westall: The same objection.

A. I don't know.

Q. 63. By Mr. Blakeslee: You were present during the examination of Mr. Scattergood as a witness in this case this afternoon, were you not?

A. I was.

Q. 64. You heard his testimony given concerning the operations of these auxiliary and main nozzles, did you not?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. Partially.

Q. 65. By Mr. Blakeslee: Do you disagree with Mr. Scattergood as to any part of his testimony in this connection?

Mr. Westall: Counsel for the defendant objects to the question. The witness has stated that he only heard partially or followed partially the testimony of Mr. Scattergood.

A. The parts of Mr. Scattergood's statements that I heard and remember at this time, I do not object to.

Q. 66. By Mr. Blakeslee: Have you had experience and education as a hydraulic engineer?

A. I have not. I have not had the education or training that would tend to qualify me as an expert on hydraulic matters. However, I have had the education such as would give a person a primary knowledge of

hydraulics and have had practical experience in operating hydraulic works.

Q. 67. Have you ever taken any course in hydraulic and education as a hydraulic engineer? *Engineering*

A. Not solely hydraulic engineering, but such as would be given with a person taking courses in engineering with some other branch as the primary object.

Mr. Westall: Counsel for the defendant at this stage, upon the last answer, moves to strike out all matters of opinion which have been heretofore expressed by the witness in answer to questions put to him by counsel, as showing clearly that this witness is not qualified to give the testimony which has been sought to be elicited.

Mr. Blakeslee: We consent to the striking out of all the testimony from the present witness amounting to mere statements of opinion pertaining to the action of the main and auxiliary nozzles and needles in the two plants under consideration, as moved by the defendant.

Q. 68. Have you any desire to depart from your previous testimony to the effect that each of the plants under consideration has a main nozzle and needle and an auxiliary nozzle and needle, and a governor controlling the main needle and connections through the returning device between the governor and the auxiliary needles?

Mr. Westall: Counsel for the defendant objects to the question as assuming matters not testified to by the witness, the testimony of record speaking for itself. Also for a further reason that it amounts to cross-examination of the plaintiff's own witness.

A. My previous answers in this regard will stand, only as regards the main nozzle. I stated in my previous testimony that the connection between the main nozzle

and its auxiliary nozzle was not direct but indirect through the hydraulic cylinder.

Q. 69. By Mr. Blakeslee: Aside from that distinction are you or are you not willing that your testimony stand as given, apart from matters purely of opinion?

Mr. Westall: I object to the question. The witness has no discretion as to whether or not the testimony he has given shall stand, and his willingness nor unwillingness that the record heretofore made shall stand is not a matter pertinent to any of the issues in this case.

Mr. Blakeslee: I assume that counsel for the defendant is familiar with that rule of evidence which permits a witness at any time during an examination to correct any statement which he has made, and with that rule of evidence in mind I am merely attempting in all fairness to the witness to give him an opportunity to clarify the record, in order that his testimony shall be as much and no more than he wishes to swear to.

Q. 70. I now show you a photograph, being Complainant's Exhibit E, covering up the identifying wording thereon, and ask you if you recognize what it discloses. If so, please state.

A. Exhibit E is a picture of No. 2 unit at the Cottonwood power house.

Q. 71. I now show you Complainant's Exhibit H, with the identifying wording thereon obscured, and ask you if you recognize what is disclosed there, and, if so, to please state.

A. Exhibit H is an interior picture of Division Creek No. 2 power plant.

Q. 72. With similar obscuration, I show you Com-

plainant's Exhibit M, and ask you if you recognize what is disclosed therein, and, if so, to please state.

A. Exhibit M is an exterior photograph of Cottonwood power house and a portion of the Los Angeles aqueduct.

Mr. Westall: Counsel for the defendant objects to the piling up of testimony identifying the various photographs which have been offered in evidence.

Q. 73. By Mr. Blakeslee: I will show you Complainant's Exhibit N in the same way, and ask you similarly what it discloses.

A. Exhibit N is also an exterior picture of the Cottonwood power house.

Q. 74. Also, similarly, with respect to Complainant's Exhibit O.

A. Exhibit O is a picture of electric dredger No. 4, somewhere in the Owens Valley, Inyo County.

Q. 75. Do you know by what power this dredger was operated?

A. Electricity.

Q. 76. From what source was this electricity obtained?

A. From the city's hydro-electric plants.

Q. 77. Where?

A. In Inyo County.

Q. 78. By what name?

A. Cottonwood and Division Creek.

Q. 79. Similarly, with respect to Complainant's Exhibit P.

A. Exhibit P is an exterior photograph of the Division Creek No. 2 power plant.

Q. 80. Referring now to the matter over which we

had difficulty, as to the question of velocity of flow of water at the main nozzle past the main needle in the plants we have been talking about, I will put the question again to you in this way: In case No. 1 the main nozzle is open and the auxiliary nozzle is closed. In case No. 2 the main nozzle is open and the auxiliary nozzle is open. First, will there or will there not be a difference of velocity of water passing in the opening of the main nozzle, as between the two cases?

Mr. Westall: The same objection as heretofore noted is repeated to this question, and further, that the witness is not properly qualified as an expert.

A. With respect to the main nozzle in each case?

Q. 81. By Mr. Blakeslee: Yes, sir.

A. Yes.

Q. 82. Having determined that there is a difference, in which case, the first or the second, does the greater velocity exist at the main nozzle?

Mr. Westall: The same objection is repeated, to-wit, that the witness is not qualified to testify as an expert.

A. In the case where only one nozzle is open the velocity of the main nozzle is the greatest.

Q. 83. By Mr. Blakeslee: Being which case by number?

A. Case number one.

Mr. Blakeslee: You may inquire:

Mr. Westall: No cross-examination.

January 17, 1914, A. M.

GEORGE J. HENRY, Jr., recalled as a witness on his own behalf, resumed the giving of his testimony in chief as follows:

DIRECT EXAMINATION (Resumed)

By Mr. Blakeslee:

Q. 117. Can you produce any further showing on paper illustrative of the construction and mode of operation of Complainant's Exhibit W, being the Lombard Governor Device?

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial.

A. I have had prepared in my drafting room and under my direction two blue prints which I now hand you, illustrative of the form of governor known as the Lombard, with and without the clutch mechanism operated from the controller for the purpose of preventing the governor from "over-running", and I have marked these blue prints, the first thereof, Z. The first, which I have marked Z, shows the elements of the governor without the controller-operated clutch, and the second, I have marked ZZ, which shows diagrammatically the same governor elements with the addition of the automatically-controlled clutch for preventing the governor from "over-running".

(The witness produces two blue prints and marks the same as testified.)

Q. 118. By Mr. Blakeslee: Are there any features shown in these blue prints in addition to the features embodied in Complainant's Exhibit W, being the Lombard Governor Device?

A. Yes. There are the other principal parts or elements of the governor that go to make up the governor, all being shown diagrammatically for the purpose of illustration and exposition.

Q. 119. I will ask you to indicate upon these blue prints by corresponding reference letters such corresponding features as you find in any of the photographs, being Exhibits E to P inclusive, in which you have testified the Lombard governor device, in counterpart with Complainant's Exhibit W, is shown, and please follow this by making such further statement as you desire relative to the operation of this governor device and the results of such operation.

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial.

A. The two Lombard governors, which I have previously testified were installed in the Cottonwood plant, are what is known as the vertical type, containing an operating-oil pump or system for shifting the power means, and the governor at the Division Creek No. 2 plant is what is known as the horizontal type using water pressure from the main pipe line or penstock for the purpose of providing the operating means with a power medium. ~~Both types of governor, vertical with a power medium.~~ Both types of governor, vertical and horizontal, although of different power capacity and outward appearance, retain the same elements in operative combination in the same operative combination for controlling the gate and by-pass. On comparing blue print Z with photographs Exhibits E, G, H, J and K, I have marked on said blue print Z letters corresponding with letters indicating similar parts, first on photo E, following each letter with a letter the same as the photograph exhibit. For example, fly ball element G on photo Exhibit E, is marked G-E on blue print Z. L-E, and K-E,

are operative connections of the returning device; D-E is a rock shaft actuated by the governor power means for shifting the water gates; H-E, the driving pulley from the wheel shaft, so that fly balls G-E will be sensitive to speed changes of said shaft.

Referring now to Exhibit G, I add the following lettering to blue print Z, indicating the same parts thereon with the same letters, and following such letters with the letter G, indicating that they are taken from photo Exhibit G: W-G is the power means set into operation from the controller valve Y-G; pump Z supplies pressure to the pipe which I have marked Z-E; the element shown in photo Exhibit E as M and in photo Exhibit G as M, is not present in the governor shown in blue print Z, as this is an automatic clutch-controlled valve, whereas in blue print Z the oil passage about the governor dashpot, which I have marked return dashpot, has no automatic means of adjustment to prevent "over-running" of the governor.

Referring now to photo Exhibit H, similar elements are indicated by similar letters. Fly balls, sensitive to speed change, appear as CC-H; operating pulley, DD-H; controller valve, EE-H; operating cylinder, FF-H; rack and quadrant, GG-H; rock shaft, HH-H.

Referring now to photograph Exhibit J, returning rack and pinion, UU-J; returning connections, XX-J. There is not present, however, in blue print Z the automatically controlled by-pass valve actuated by the clutch under the control of the controller as indicated in photograph J with the letters YY and ZZ. The same applies to photo Exhibit K. The elements thereon

shown as YY and ZZ, automatically controlling the rate of returning from the controller to prevent the governor "overrunning" not being present in the blue print Z.

Referring now to the blue print ZZ, I have marked thereon all of the elements appearing on blue print Z and exactly the same as thereon appearing, with the exception of the following: Returning dashpot I have marked "Automatically controlled returning dashpot," such automatic control being accomplished through the needle valve which I have marked YY and which is moved by the clutch ZZ, exactly the same as accomplished in Lombard governor part Exhibit W now in the case. The automatic action that takes place and which prevents the governor "over-running" is, in blue print ZZ, that upon shifting of the controller by the speed-sensitive means which admits pressure fluid to and from the operating cylinder, I have marked "controller"; I have marked the operating cylinder "operating cylinder"; the connections L-E and K-E actuate with positive motion the piston in the returning dashpot, shifting thereby the rack and rotating the pinion shown at UU-J, and causing a movement of the clutch bar on one or the other of the sloping jaws of the stationary clutch element ZZ, thus causing, whenever the returning dashpot has been displaced from its normal position, the pinion, UU-J, to rotate, to shift the screw threads on the valve stem, so marked, an automatic opening of valve YY; the degree of opening being greater or less as the returning movement of connections L-E is greater or less, which, in turn, is greater or less, depending on the degree of movement of the controller, because the greater the

movement of the clutch bar on the sloping side of ZZ, the more is the valve YY displaced from its ~~support~~. Consequently, upon great movements of the controller valve, we have preportionally greater movements of the clutch ZZ and its associated clutch bar, opening of YY, permitting the governor valve stem, actuated through the rack and pinion UU-J, to return, shifting the screw threads on the valve stem in a direction to return the controller to its zero or normal position. The rate of the return of this controller to its zero or normal position is thus automatically effected through the setting into operation of this clutch ZZ and its associated clutch bar from the first movement of the controller; and such rate of return of the controller to its zero or normal position is gradually retarded automatically as the clutch bar slides down the side of the clutch ZZ, gradually and automatically closing the valve YY. It will thus be evident that the governor will upon great load changes, and consequent great demand for shifting of water gates, act quickly to make such gate movement, and that during the period when the speed is returning to its correct number of revolutions, said returning movement of the governor will take place rapidly during the first part of the change and at a slower and slower rate as the valve YY approaches its seat. And when it has closed the port, thus locking the by-pass for the oil, the governor ceases further returning movement before it has "over-run." On very slight movements of governor action by very slight changes in the speed, calling for slight movements of the water gates, valve YY is not set into motion, or if so, only to an extremely slight degree. Its

value consists in being able to meet sudden or severe changes of load, and bring the speed back without "over-running" with a great degree of accuracy and rapidity. In practice, water wheel governors are in movement and are causing the movement of water gates at substantially all the time during the operation of the water wheel. Such controlling of the water gates is what might be called a continuous process by the governor. But there are periods in practice on an ordinary plant—probably every 10 minutes would not be an exaggeration—at which the automatic clutch ZZ with its clutch bar and automatically moved valve YY from the shifting of the controller and for the purpose of returning the controller to its normal or zero position, take place. In practice before the introduction of the⁴ automatic means, it was customary, as was familiar to most of us who have attempted to use incandescent lights in our homes before the year 1901 or 1902, and, possibly, a year later in this territory, that the incandescent lights would a number of times in an evening show a decided increase or decrease in the illumination; they would burn high or low for a period of a number of seconds or minutes, thus greatly inconveniencing users. The introduction of this automatic returning feature on the governor of hydro-electric plants has eliminated these periods of departure from good illumination, and have, of course, affected an equivalent improvement to the service in other electric devices. The device of the Lombard governor, and which is in the case as Exhibit W, contains this automatically controlled portion as just indicated and described on blue print ZZ.

Mr. Blakeslee: The blue prints just produced and discussed and marked by the witness are offered in evidence as Complainant's Exhibit Z, blue print of Lombard Governor Device without control-operated clutch, and Complainant's Exhibit ZZ, blue print of Lombard Governor Device with control-operated clutch.

Mr. Westall: Counsel for defendant objects to the introduction of the blue prints referred to as incompetent, irrelevant and immaterial, and as not fully shown to be authentic.

~~That~~^{Ex} said blue prints so offered in evidence are respectively marked by the Examiner as "Complainant's ~~Exhibit Z, blue print of Lombard governor device without~~ out control-operated clutch," and "Complainant's Exhibit ZZ, blue print of Lombard Governor Device with control-operated clutch."

Q. 120. By Mr. Blakeslee: Can you state how these blue prints were produced?

A. Yes. As stated before, they were produced under my direction in my drafting room from years of familiarity with the particular device and governor that they represent. I have designed and built probably 200 water wheel governors.

Q. 121. In your previous testimony you have referred to the making of certain sketches upon January 2nd of this year at the Cottonwood and Division Creek power plants, prior to the execution of Exhibits U and V, being line drawings of nozzles, etc. Can you produce any such sketches at this time?

A. I can and do. My testimony was that these line drawings were produced from sketches and photographs. The photographs I have already produced, and I herewith produce these sketches.

Q. 122. And the photographs referred to are those in evidence as Complainant's Exhibits E to P inclusive?

A. Yes sir.

Mr. Blakeslee: These sketches just produced by the witness, with the letterings thereon, and the Pullman Company's passenger checks attached thereto, all mounted upon two separate sheets of paper, are offered in evidence as Complainant's Exhibit UU and VV.

Mr. Westall: Counsel for the defendant objects to the offered sketches and the passenger checks as incompetent, irrelevant and immaterial, and especially objects to the passenger checks attached thereto, on the ground that there has been no proper foundation laid for their introduction in evidence.

The examiner thereupon marks the said two exhibits so offered as Complainant's Exhibits UU and VV respectively.

Q. 123. By Mr. Blakeslee: What does the sketch Exhibit UU depict or show?

A. It shows the arrangement of the governor parts and water gate, or needle nozzle and by-pass and by-pass valves, or, as it has been called, auxiliary nozzle, and which I have further shown on a large line drawing now in the case as Exhibit U, and which referred to the Cottonwood plant of the Los Angeles aqueduct about which I have previously testified.

Q. 124. In so far, am I to understand, as these parts are part of the installation testified about, is that correct?

A. Yes sir; they are sketches of those parts mentioned in my answer, being a part of the entire governor apparatus. The balance is shown in the photographs E

and G, which were more accessible to photographic work, being above the floor, and these parts shown on the sketch being below the floor and difficult to photograph; photo Exhibit F being, however, a photograph indicating them as far as it was possible to obtain by photographic means.

Q. 125. Now, please similarly state what is indicated in the sketch attached to the sheet marked VV?

A. This sketch which you have handed me illustrates analogous parts, that is, the water gate and nozzle and auxiliary nozzle or by-pass, and their valves and connections, at the Division Creek plant number 2, which parts are more clearly shown in photos H to L inclusive.

Q. 126. You were present, were you not, yesterday afternoon during the taking of the deposition in this case of Mr. E. F. Scattergood?

A. Yes sir.

Q. 127. In his testimony he made reference to a certain part shown in Complainant's Exhibit I and marked NN, referring to the same as a bell crank. From your knowledge of mechanical nomenclature is this the best term to apply to the part in describing it?

A. I would scarcely so consider it. A bell crank, in mechanics, usually refers to a double lever having its two members at right angles to each other, and pivoted at their joinder, whereas the part NN on this photograph is a double lever with the two elements in line with each other, and pivoted at the center, causing an opening of the by-pass element as the water gate closes, and vice versa.

Q. 128. Mr. Scattergood also referred to a shaft as

extending toward the governor and as connected with the lever K. I note there is a part II extending from this lever. What would you term this part?

Mr. Westall: Objected to on the ground that it is incompetent, irrelevant and immaterial.

A. It is probable that Mr. Scattergood has not had occasion to describe the various governor elements in a hydro-electric installation with sufficient frequency to have become familiar with the terse engineering language of the present day, as many of his terms were a little old fashioned. I have endeavored throughout my testimony to give the old fashioned term as well as the modern term where there seemed a possibility of any confusion or an opportunity to make the record clearer. For example, I used the term "penstock" or pipe line. The word "penstock" is quite an old fashioned term and is not and should not be used as describing a pipe line of the present day where the pipe is long and steep. It is a term applied to the practice in the days of short, large-diameter pipe lines, used for turbine water wheels. I have also used the words "water gate" or "needle" or "needle nozzle" as being synonymous.

Mr. Westall: Counsel for the defendant moves that all that part of the answer beginning with "It is probable that Mr. Scattergood" be stricken out as not responsive to the question.

Q. 129. By Mr. Blakeslee: I further notice that Mr. Scattergood referred to the end of the shaft LL as being received in a socket. Is that the term mechanical engineers customarily apply to the part referred to by Mr. Scattergood?

Mr. Westall: Objected to on the ground that it is incompetent, irrelevant and immaterial.

A. No sir; the end of the shaft LL in photograph Complainant's Exhibit I is carried in a bearing or pillow block.

Q. 130. By Mr. Blakeslee: Similiarly I notice that Mr. Scattergood in his deposition objected to some of the terms you have applied to the parts of the governor under discussion, such as the terms "water gate", "valve", etc., as applied to needles of the nozzles, and the needles acting in conjunction with the nozzles. Have you any explanation as to the discrepancies in the choice of terminology made by Mr. Scattergood and that which you have made in your testimony?

Mr. Westall: Counsel for the defendant objects to the question on the ground that it is irrelevant, immaterial and incompetent.

A. I believe there is no difference between Mr. Scattergood's testimony and mine except in the use of terms. By using the words "water gate" in Exhibits U and V I meant exactly the same as Mr. Scattergood does in his testimony. He is correct in saying that the particular type of water gate herein illustrated is what is known as a needle, and, when, in combination with its stem, it forms a needle valve, the nozzle part in which this works and having the opening within which the needle is actuated, forming a water gate. The same is true of the several elements that are shown as "by-pass and "by-pass valve" and its associated operating stem. This particular type of water gate consisting of a needle, its needle stem, and the nozzle, pipe within which it actu-

ates, is one that has come into extensive use in recent years.

Q. 131. By Mr. Blakeslee: When you say that you believe there is no difference between your testimony and Mr. Scattergood's, I take it that you are referring to the nature of the parts as to which there is a diversity between the terms used by him and those used by yourself. Is that correct?

A. Yes sir; the parts mentioned in my last answer.

Q. 132. Do you think that the fact that Mr. Scattergood is more pre-eminently occupied as an electrical engineer has any bearing on the choice of his mechanical terms?

Mr. Westall: Objected to on the ground that it is incompetent, irrelevant and immaterial.

A. Yes sir; I do.

Q. 133. By Mr. Blakeslee: Mr. Scattergood and Mr. Heinze have identified Complainant's Exhibit O as being a dredge which has been operated by electrical energy from the Cottonwood and Division Creek power plants, about which you have testified, one or the other or both thereof. Will you please state what effect the load factor involving the operation of such a dredger would have upon water wheel control in a plant such as the Cottonwood plant or Division Creek number 2 plant?

Mr. Westall: Counsel for the defendant objects to the summarization by counsel of the testimony of Mr. Heinze and Mr. Scattergood as to what the photograph in question shows, and also objects to the remainder of the question, as incompetent, irrelevant and immaterial.

A. A load factor of an electric system supplied from

the two hydro-electric plants in question and serving electricity for one or several dredges as indicated in photo Exhibit O, would vary very greatly from time to time. A curve indicating the load during the day would have many "saw-teeth" or peaks and depressions therein, such peaks being an indication of a demand for greater electric power, and the depressions an indication of a reduction of demand for electric power by the apparatus being served. These peaks and depressions in supply and demand are all reflected in governor movements and water gate and by-pass movements in the plants supplying the power. In practice there are two or more plants supplying current to one line, from which line various pieces of apparatus, as motors and lights, are supplied their requisite energy. If a dredge, as illustrated in photo Exhibit O, is operating, there are several motors thereon supplying the power required by the different parts, and a motor of very considerable power—that is, one whose power requirement is a large percentage of the total power supplied from the plants,—for the purpose of operating the shovel, bucket or scoop shown in the immediate foreground in the photograph. Whenever the shovel is plunged into the earth or material to be removed, it throws instantaneously upon its motor a very heavy load, which load must at once be supplied from the generating station and, therefore, the water wheels, and there must be a corresponding movement of the water gates to supply water from the pipe line to the water wheel. The variations occasioned by dredger service are extremely great, being one of the most severe forms of service met with in hydro-electric

transmission service. A recording apparatus indicating gate movement by the governor would, upon such dredging operations being performed, show a very great demand for power and corresponding gate movement on the shovel entering the dirt to be removed; and a sharp depression in the curve showing the power rejected upon the bucket being raised and emptied. It is obvious that the water gates while in operation almost continuously for small variations in power required by the remaining general service of motors and lights, would at times of great load demands and rejections, as in the case of the shovel being operated in the dredge, show a very considerable or unusual movement. It is at such times as this that the movement of the by-pass becomes effective to prevent dangerous ⁱⁿ ~~inert~~ia effects in the pipe line,—dangerous both to the safety of the line and the accuracy of governor control. If such accurate governor control is not maintained over periods of these peaks and depressions in the load curve, adequate service would not be performed by those motors and apparatus and lights being supplied from the same system. For example, a centrifugal pump being driven 50 miles away might lose its load entirely unless the speed were kept up by the governor.

Q. 134. By Mr. Blakeslee: Mr. Scattergood testified with relation to a certain breakage or rupture which had taken place in the penstock or supply line pipe of either the Cottonwood plant or Division Creek plant number 2 under discussion. Did you hear his testimony as to this?

A. I did hear him so testify.

Q. 135. What have you to say with respect to the relation of the governor of such part to such rupture or breakage, within your knowledge of the installation of such plants, as testified to by you, your knowledge of the operation thereof, and your general knowledge as to the inertia effects in such pipe lines.

A. Such pipe rupture and resulting expensive damage and interruption of service as Mr. Scattergood testified to, is to be expected whenever a governor is permitted to shift the water gate rapidly in a closing direction, unless the by-pass is opened sufficiently to prevent such water ram. The case of breakage he speaks of, beyond all doubt, was occasioned by the by-pass not being opened in this one instance when the governor moved the water gate or needle in a closing direction. The proof that it must have been as I so indicate lies in the fact that numerous short circuits and heavy demands for power were made for a number of years and are at times made now on these plants, and the governor does now frequently move the gate in a closing direction with rapidity and to a large degree, and the auxiliary nozzle or by-pass with its needle valve is operated in an inverse direction by the governor to prevent such breakage. By referring to Exhibits U and V it will be seen that there are adjusting screws for adjusting the rate of return to normal of the by-pass, and these are indicated on said Exhibits U and V by the words "adjusting screws" shown on the oil dashpot in the lower portion of the drawing. The operators in charge of the plant, if careless, might readily leave the adjusting screws on said oil dashpot or hydraulic cylinder, as

mentioned by Mr. Scattergood, too far open, thus preventing the by-pass valve from opening with sufficient rapidity as the main water gate was moved in the closing direction by the governor. A water ram in the pipe line would therefore occur at this time of inoperative by-pass movement, which would in all probability seriously damage or rupture the main supply pipe, causing in some cases many thousands of dollars of expense. There could not be a better demonstration of the necessity of by-passing water on the movement of the water gate for the purpose of preventing inertia effects, than the lesson of the broken pipe in the present instance.

Mr. Westall: Counsel for the defendant moves to strike out the answer as not responsive to the question. Counsel for the defendant also objects to this method of rebutting the effect of the evidence given by the plaintiff's own witness, Mr. Scattergood.

Mr. Blakeslee: Careful attention to the testimony of the present witness relative to that of the witness Scattergood and witness Heinze will make it clear that the present testimony of the witness merely produces a corroboration, or, we will say, merely tends to corroborate the testimony heretofore given in this case; and if there is any possible contradictory result obtained, the evidence will speak for itself and the weight of the evidence must decide the points involved, by preponderance.

Mr. Westall: Counsel for the defendant suggests that the foregoing examination of the witness would make it appear that the complainant is seeking to take advantage of the testimony given by its witnesses, Mr.

Scattergood and Mr. Heinze, in his favor, and seeking to disclaim and exclude all evidence, which, in his opinion, is not favorable to the complainant.

Mr. Blakeslee: This is not a time for arguing this case, and we object to the attempts of counsel for the defendant to argue the case upon the record, and to incumbering the case in that way. A great many of the objections of counsel for the defendant verge upon such argumentative quality, and, if the same are persisted in, we shall have to move that the cost of reporting, transcribing and returning the record, be taxed proportionately against the defendant.

Q. 136. Please point out again on Exhibits U and V the means of adjustment which you have referred to in your last previous answer for varying the sensitiveness or responsiveness of the by-pass.

Mr. Westall: Counsel for the defendant objects to the question as having been already fully covered by the witness in his previous examination, and as being a mere repetition.

A. The adjusting screws are labeled "adjusting screws" and are shown on the part marked "oil dashpot" on both of these exhibits.

Q. 137. By Mr. Blakeslee: Please define a little more in detail what this adjustment causes?

A. The movement of these adjusting screws which are set from time to time to correspond with the rate of the governor movement, as limited by other governor adjustments, is for the purpose of varying the area of the port through which the oil passes from one side of the dashpot cylinder to the other, around the piston, so

as to permit the dashpot to return the by-pass valve to its normal position with a greater or less degree of rapidity. And it is obvious that if they be adjusted for a wider open port the by-pass valve will return at a greater rate; and if the port be adjusted by them to a smaller area, the by-pass valve will return at a slower rate. Most accurate governing is attained where this rate is slower than a rapid movement of the governor.

Q. 138. Referring now to the Lyndon patent in suit, marked for identification, and to Complainant's Exhibit D, please a little more fully point out the sequence of energization of the electro magnets 15 or 16, as a first group, and 32 as a second group, and 64 as a third group. Also, in the same ^{answer} ~~manner~~, you may point out the sequence of de-energization involving these groups of electro magnets. Further, again state the results of such energizations and de-energizations.

Mr. Westall: Counsel for the defendant points out that this matter has already been very thoroughly covered in the prior examination of this witness and that this question merely calls for evidence upon a point that has already been thoroughly gone over and covered.

A. I now refer to figure 1 in the Lyndon patent in suit. Magnets 15 and 16 are energized through the action of the solenoid 33, one or the other of these magnets being energized for every governor movement. This is occasioned by an increase or decrease in the voltage of dynamo 8, actuated from the water wheel shaft, said voltage rising or falling at a rapid rate on an increase or decrease of speed. If the speed increase is but slight, the plunger 34 is pulled but a short distance into the

solenoid 33, causing contacts to be made at 40, 40a, and magnets 15 to be energized, said movement being sufficient to energize magnets 15, but not sufficient to cause contacts to be made at the end of the bar which is pivoted at 43a. The action of the governor will then be a rotation of the shaft 12 and the shifting of the turbine gate on the stem 21b to a slight degree. In such cases the inertia effects on the pipe line are but slight, and the speed of the wheel corrected before material departure from normal. If now, instead of a slight increase in the speed of the wheel due to a very small rejected load, we assume a case where the load rejected is greater, as, for example, when the dredger shovel is lifted and emptied, the speed of the water wheel increases at a quicker rate and establishes a greater voltage variation from dynamo 8, sensitive to the said speed, a heavier pull by the solenoid 33 on plunger 34, causing contacts to be made at 40 and 40a respectively as before; but said movement of plunger 34 being now greater than formerly, causes contacts to be made at 45a, 45, 46a and 46, causing the energization of magnets 32, and a movement of the returning mechanism through the clutch plate 23, 22; and contacts to be made between 100 and 103, and 101 and 104, and in energization of electro-magnets 64, and an opening movement of by-pass valve 48. Said returning mechanism and said by-pass movements actuated respectively from the energizations of magnets 32 and 64, proceeds until such time as the solenoid 33, energized from dynamo 8, permits the movement of the plunger in an outward direction to be made through the action of spring 38, which draws the plunger out as the

voltage reduces, contacts being broken and interrupting the work of the magnates 32 and 64 first, and finally the movement of the plunger 34 proceeding in an outward direction and the breakage of the contacts at 40, and interrupting the further action of the governor. The introduction of the movement of the clutch means 22, 23, during periods of considerable governor movement and its elimination when the speed has returned closely to normal, and the final remaining movement which breaks the contact at 40 and 40a, bringing the mechanism to rest at the moment that the speed has returned to normal, accomplishes most perfect governing. The reverse action takes place on a decrease of speed. That is, magnets 16 are energized only for only a slight reduction in speed, and magnates 32 and 64 remaining inoperative unless the voltage from the dynamo 8, actuating solenoid 33, drops to a sufficient degree to enable the contracts previously mentioned to be made for energizing magnets 32 and 64. It is obvious that by adjusting contacts 45a, 46a, 100 and 101, or their associated anvils, we may energize magnets 32 on a slighter or a greater movement of the solenoid plunger 34, anticipating or following with the energization of magnet 64, dependent on the requirements of each individual installation. For example, for a long pipe line, where the inertia effects on sudden velocity change are greater, we must set into operation earlier and more delicately adjust the returning of the by-pass valve 48; whereas, for a short pipe line we may remove contacts 100 and 101 further by adjustment from contacts 103 and 104, so that magnet 64 is not energized except for greater

speed changes, thus taking care of inertia effects only at such times as they become serious.

Q. 139. By Mr. Blakeslee: Please state separately what causes selective energization of electro-magnets 15 and 16.

A. Magnet 15 is energized when an over-speed occurs, and must be reduced by a closure to a greater or less degree of the water wheel gate. Magnet 16 is energized when a reduction in speed of the water wheel occurs, due to a greater demand of load, and its energization is for the purpose of bringing about movement in the governing mechanism to open to a greater or less degree the water wheel gate.

January 17, 1914, 2:00 P. M.

GEORGE J. HENRY, JR., recalled, resumed his testimony in chief as follows:

DIRECT EXAMINATION (Resumed)

By Mr. Blakeslee:

Q. 140. Please now compare the disclosure of the Lyndon patent in suit with the disclosures of Complainant's Exhibits E, F, G, H, I, J, K and L, supplemented by the disclosures of Complainant's Exhibits U and V, as merely assisting evidence, or evidence explanatory of such disclosures of Exhibits E to L, and with the disclosures of Complainant's Exhibits W and X, as merely assisting and explanatory evidence or disclosures, and likewise of Complainant's Exhibits Z and ZZ, to be utilized similarly as assisting disclosures or embodiments—and predicate such comparison upon construction, combination, inter-relation and operation of the

disclosures of the Lyndon patent in suit, on the one hand, and the disclosures of said enumerated exhibits, on the other hand.

A. I think I have in response to previous questions made clear the action that takes place in the several co-related elements in the Lyndon patent by reference to the drawings therein contained, and which description by me and the drawings of the patent show clearly, referring now to Exhibit A, the Lyndon patent in suit, a water wheel governor consisting of a combination with a water gate operating shaft, being 20 in figure 1, means for operating the same in either direction to govern the water wheel, being shaft 6, movement being transmitted through gears 9 or 10 to the gear 11 and shaft 12 through the action of the clutch movable in either direction by magnets 15 and 16, of a controller for said operating means, being solenoid 33, actuating plunger 34, and its connections, responsive to changes of speed of the water wheel, being the action of solenoid 33 on voltage variations from dynamo 8, a returning device for said controller provided with clutch connection to said operating shaft, being clutch plate 23 actuating 22, rod 25, springs 28 and 27 and 29 and their associated parts, and means actuated by said controller on movement thereof from normal position to engage said clutch with said shaft, being those parts actuated from solenoid plunger 34 and causing contacts to be made at 45a, 46a and 45 and 46, so as to cause the return of said controller to normal position and interrupt the governing action before it has over-run the proper amount, this being accomplished through the displacement of lever 26

actuated by springs 27, 28, rod 25, from clutch 22, 23, and I find the mechanical equivalent of said parts in photographic exhibits you have handed me and mentioned in your question, and descriptive drawings U and V, as existing completely in the apparatus as therein disclosed, and as in existence, and as I saw in operation on the unit number 2 at the Cottonwood plant and the unit in Division Creek plant number 2. By referring specifically to Exhibits E, F, and G, being of the apparatus in the Cottonwood plant, and Exhibit U, being a line drawing illustrating more clearly certain of the parts, the several parts being lettered in said exhibits as follows: A water wheel governor consisting of a combination with a water gate-operating shaft D; means for operating same in either direction to govern the water wheel, operating cylinder W; a controller for said operating means responsive to changes of speed of water wheel, this being the valve set in the governor casing at Y, which is responsive to the speed of the water wheel by movement imparted to it from the fly balls G, actuated from the pulley H by belting on the shaft I; a returning device for said controller provided with a clutch connection to said operating shaft,—I find these parts at L, K and M. The clutch portion of this device is also clearly shown in model Exhibit W. I find means, actuated by said controller on movement thereof from normal position to engage said clutch with said shaft so as to cause the return of the controller to normal position and interrupt the governing action before it has over-run the proper amount, in connections L and K.

Referring now to photographs Exhibits H, I, J, K, L and line drawing V, I find the same elements as follows: Water-gate-operating shaft L is indicated by LL; means for operating the same in either direction is shown in governor cylinder FF; the controller for said operating means is contained within the casing on top is shown at EE, this being responsive to changes of speed of the water wheel through its stem connection VV, with the fly balls CC actuated by pulley DD from the water wheel shaft TT; a return device for said controller I find at XX and UU, provided with a clutch connection to said operating shaft; I find said clutch at ZZ actuated through the connections XX, and means actuated by said controller on movement thereof from normal to engage said shaft I find in parts XX so as to cause the return of the controller to normal position and interrupt the governing action before it has over-run the proper amount, such functions being performed through the clutch ZZ automatically actuating the by-pass valve YY and the dashpot of the returning apparatus.

Referring now to claim 4 of the Lyndon patent and to the devices illustrating the apparatus at the Cottonwood plant, I find in photo Exhibit E, F, G and line drawing Exhibit U, a water wheel governor consisting of the combination with a water-gate-operating shaft, in either direction, indicated by D on said exhibits; a controller responsive to changes of speed of the water wheel has been pointed out as above and is indicated at Y; ~~on G, H, and I~~; fly balls G, pulley H, shaft I; a controlled reversing gear, being the cylinder F, operating piston in either direction, thus actuating the rock shaft D in

either direction, and a returning device for said controller connections K and L, acting upon the valve stem connection between the controller and the fly balls as exhibited in Exhibit ZZ; and provided with actuating means controlled by said controlling means to return the controller to inoperative position, as indicated by the valve shown in the above mentioned photo exhibits at M and as shown in the white metal clutch parts and brass needle thereof in exhibit W, and as shown in blue print Exhibit ZZ and marked ZZ, clutch bar and valve YY.

Referring now to the apparatus at the Division Creek number 2 plant, corresponding parts there exist in the same combination and perform the same function in substantially the same way as called for in the Lyndon patent, and as they do also at the Cottonwood plant apparatus, such parts being in exhibits H, I, J, K, L and Complainant's line drawing Exhibit V and blue print ZZ and Exhibit W. I find therein a water wheel governor consisting of the combination with a water-gate-operating shaft LL; a driving shaft HH; a reversing clutch gear, cylinder FF, operating in either direction; a controller responsive to speed changes of the water wheel as pointed out above, and which controller controls said reversing gear, and a returning device for such controller consisting of parts XX and UU, through the rotation of stem VV, provided with actuating means controlled by said controlling means; I find in clutch ZZ an automatically actuated valve YY, which parts return the controller to inoperative position so as to prevent excessive movement of the governor. These parts are

found in the drawing figure 1 of the Lyndon patent, being the same parts as testified to above and as covered by claim 3.

Referring now to claim 6 of the Lyndon patent in suit, and to figure 1 thereof, I find a water wheel governor consisting of the combination with means of operating the water gate in either direction, being shafts 12 and 20, to which motion is transmitted through gears 9 or 10 to gear 11 by the shifting of the reversibly operating clutch, 13, by the action of the magnet 15 or 16, depending on which one is energized; a by-pass for the water wheel 47; a valve controlling said by-pass, 48, and means connected to the water-gate-operating means and operating the by-pass valve inversely to the operation of the water gate. I find in clutch 58, sheave wheel 54 and its mechanical connections to valve 48, through the stem 49, all set into operative movement by the action of electro-magnets 64 actuated by the electric contacts previously described and energizing said magnets 64 on operation of the solenoid through variations in voltage of the dynamo 8 responsive to speed changes of the water wheel.

Referring now to Exhibits E, F and G and line drawing U, and the apparatus there illustrated, and in operation in the Cottonwood plant, about which I have previously testified, I find a water wheel governor having the combination with means ^{for} ~~of~~ operating the water gate in either direction, being connections from the rock shaft D, connections P, Q, R and S, a stem N, actuating the water gate or needle valve; a by-pass for the water wheel; a valve controlling said by-pass and means con-

nected to the water-gate-operating means and operating the by-pass valve inversely to the operation of the water gate, in connection U and R, the latter pivotally mounted at T.

Referring now to the apparatus installed in Division Creek number 2 and as illustrated in photographs H, I, J, K, L and line drawing Exhibit V, I find elements identical and complete with those set forth in claim 6, as follows: A water wheel governor, ~~with means~~ a water wheel gate, of means for operating the water gate in either direction, cylinder FF actuated by governor parts previously described, together with its gear connections GG, rock shaft HH and connecting rod II, gate-operating shaft LL, ^{stem} double lever NN, operatively connected to water gate MM; the by-pass for the water wheel and a valve controlling said by-pass; of means connected to the water-gate-operating means LL and operating the by-pass valve inversely to the operation of the water gate through double lever NN, pivot RR, and by-pass valve and valve stem which I now designate on Exhibit V as "by-pass valve stem" and on Exhibit U I similarly designate the by-pass valve stem, it being in dotted lines in both of these exhibits as it goes throughout most of its length within the casting and is a straight stem connection to the valve at the outlet nozzle or pipe, and having connections at the other end, as testified to, with the dashpot cylinder, and through the body of oil contained in the dashpot, to the piston therein, and piston rod UUU, pivotally connected to the double lever NN at RR and SS.

Referring now to claim 7 of the Lyndon patent in suit and to the drawing figure 1 thereof, I find a water wheel governor having the combination therein with means for operating the water gate in either direction from normal position as already set forth above in my answer; a by-pass for the water wheel and a valve for such by-pass, as set forth above in my answer; of means connected to the water-gate-operating means and adapted to operate the by-pass valve from normal position in either direction, as set forth above in my answer, so as to control such valve inversely to the control of the water gate, as set forth above in my answer, during the governing action of the water gate, as set forth above in my answer, and means for returning the by-pass valve to normal position on completion of governing movement of the water-gate-operating means. I find this element clearly set forth in the returning of the valve 48 in by-pass 47 through the action of weight 70 acting in dash-pot casing 69, figures 3 and 4 of the Lyndon drawings, which returning action takes place on the de-energization of electro magnets 64 on the interruption of the contacts 100, 101, 103 and 104 as previously described.

Referring now to the apparatus as installed at the Cottonwood plant and as previously testified to, and to the photographic Exhibit F, I find the connection U and behind it in the obscure dark portion, so as to be impossible to show in the photograph, the oil dashpot, or as Mr. Scattergood and Mr. Heinze have testified to, the hydraulic cylinder mounted with the by-pass valve stem to connect the by-pass valve with the operating lever through the connection U, and springs mounted on each

side thereof, so that when the by-pass valve has been shifted from its normal position through the governor action before described, the by-pass slowly returns to normal position under the action of the springs by the passing of oil from one side of the cylinder to the other through a port under the control of the adjusting screws, this movement of the by-pass valve taking place after the completion of the governing movement of the water-gate-operating means, so as to slowly retard the water column in the supply pipe and prevent inertia effects.

Referring now to photographs Exhibits H and I, showing the corresponding apparatus in the Division Creek number 2 plant, this oil dashpot or hydraulic cylinder and its associated springs, being the means for returning the by-pass valve to normal position on completion of governor movement of the water-gate-operating means, is shown as OO, and WW. The two adjusting screws with square heads are clearly shown in this picture.

Referring now to claim 8 of the Lyndon patent in suit and to the drawings disclosed in said patent, I find therein a water wheel governor, in combination with a shaft for operating the water gate in either direction from normal position, a by-pass for the water wheel and a valve for such by-pass normally held in partly open position, an operating device for said valve provided with means for returning the valve to normal position, all as testified to above; and in combination therewith a clutch, adapted to connect said operating device for the by-pass valve with the water-gate-operating shaft, to control the by-pass valve inversely to the water gate, said

elements are found in clutch 58, sheave 54, magnets 64 and connections as previously testified to; reversing means for operating the water-gate-operating shaft in either direction; a controller, responsive to the speed of the water wheel, and controlling said reversing means, all as previously testified to; and means operated by said controller to bring the aforesaid clutch into operation and to release said clutch when the governing action is effected, I find in contacts 100, 101, 103 and 104, actuated from the connections to the solenoid and under the control of movements produced therein by the voltage variations in dynamo 8, all as previously testified to.

Referring now to the devices previously testified to as existing in the Cottonwood plant and the Division Creek plant number 2, and referring to that element previously referred to as the hydraulic cylinder or oil dashpot in the train of connections for operation of the by-pass valve from the water-gate-operating shaft, it will be noticed that springs are mounted upon each side of said cylinders for the purpose of producing the requisite displacement pressure to restore said by-pass valve after its disturbance from normal position by the action of the governor. Said springs are not put into operation except by such displacements as are brought about by the reversing means of the governor operated by the controller, and are therefore set into operation during governor action and released when the governing action has been effected, and as such act in the same relation as the clutching means in the Lyndon patent which pick up the weights 70 in the dashpots 69, and

221 3 with means

225 insert bottom of page "It is understood and
agreed that the cross-examination of Mr.
Henry may be made in San Francisco during
the latter part of next week, and that he will
appear for that purpose, or at such time and
place as may be hereafter agreed upon. Com-
plainant's counsel also reserves the right to
recall Mr. Henry for further examination,
subject to the usual further cross-examina-
tion, as to any such testimony, at any time
prior to the completion of Complainant's
prima facie case."

which are released from said weights after the governing action is effected. Said springs on the oil dashpots in the Cottonwood apparatus and the Division Creek number 2 apparatus are shown respectively on line drawings Exhibits U and V and are shown in the photographs of the Division plant just above the floor line and under the point marked 00 in paragraph H, shown on both sides of the by-pass dashpot cylinder, one of these being marked WW in photograph I, and as testified to by Mr. Scattergood and Mr. Heinze, and serve the purpose of forcing oil through the by-pass of said dashpot when they are brought into operation as aforesaid, and permitting a displacement of the by-pass valve with respect to the movement of the governor rock shaft. If the rate of return permitted by the adjusting screws in this dashpot is faster than the movement of the governor, said by-pass valve is not under such slow governor movement displaced from its normal position. In such cases as the governor movement is sufficiently rapid to "pick up" said springs by displacing the dashpot and the by-pass valve, the action that then takes place is exactly the same as that in the Lyndon patent from the energizing of the magnets 64 and operative rotation of sheave 54 by the engagement of clutch plate 58 through the making of the circuit through the previously mentioned contacts 100, 101, 103 and 104.

San Francisco, California, January 22, 1914,

2 o'clock P. M.

This being the time and place to which the further taking of depositions was continued, the taking of depositions was resumed.

insert

PRESENT:

RAYMOND IVES BLAKESLEE, Esq., solicitor for Complainant.

JOSEPH F. WESTALL, Esq., solicitor for defendant.

C. L. CORY, a witness produced on behalf of complainant, being first duly sworn, testified in answer to interrogatories by complainant as follows:

DIRECT EXAMINATION.

Mr. Westall: At this time counsel for the defendant objects to the calling of Professor Cory as a witness, and to his testifying in this case, until after the examination of the complainant, Mr. Henry, it having been heretofore agreed that Mr. Henry's testimony would be taken in San Francisco, and it being understood that that testimony should follow the usual course and be taken in its proper place at the conclusion of the calling of the testimony of Mr. Henry. It was not understood that counsel for complainant could put in his entire prima facie case in the absence of cross-examination. No right to cross-examination was waived.

Mr. Blakeslee: We deny any such agreement as specified by counsel for the defendant. The record shows that the only agreement was that counsel for the defendant should have opportunity to cross-examine the witness Henry in San Francisco. Notice was further given that Mr. Henry might be recalled for further testimony and it is our purpose to recall Mr. Henry, and after the conclusion of his direct examination counsel for the defendant may cross-examine him. There is no

stipulation in this record permitting counsel for the defendant to postpone cross-examination of any witness further than as specified as to Mr. Henry. Counsel for complainant and Mr. Henry and the Special Examiner were present as per adjournment taken last week on the morning of this present day, at which time counsel for the defendant, had he appeared, might have cross-examined Mr. Henry.

Mr. Westall: Counsel for the defendant wishes it to appear of record that the reason of his delay was the delay of the train caused by causes over which he had no control; and if counsel for complainant had proceeded as he had a right to go on with the testimony this morning in the absence of counsel for the defendant, he could have gone on.

Q. 1. By Mr. Blakeslee: Please state your name, age, residence and occupation.

A. My name is C. L. Cory; age, 41; occupation, teacher of engineering, and consulting engineer.

Q. 2. In what institution do you teach engineering?

A. University of California at Berkeley.

Q. 3. Will you please state what scholastic and technical training you had prior to teaching engineering and entering upon your profession as a consulting engineer?

A. After graduation from the common schools I entered Perdue University in Lafayette, Indiana, and graduated from a course in mechanical engineering in June, 1889, and I was an assistant in the electrical laboratory at Perdue for one year, and entered Cornell University at Ithaca, New York, as a graduate student, in October, 1890, and received the degree of Master of Mechanical

Engineering there from Cornell in June of 1891. I taught engineering in Highland Park College, Des Moines, Iowa for the academic year 1891-92, and was elected to an assistant professorship in the University of California in September, 1892, and have been connected with that institution continuously since that time.

Q. 4. Are you acquainted by scholastic training or experience with any other branches since, or lines of engineering work, than that specified?

A. I am acquainted, and, to a certain degree, experienced in other lines, not so much by scholastic training as from experience as a consulting and advisory engineer, the other related lines being specialties such as the production of power from fuel such as steam engines, steam turbines, gas engines and the like, and especially during the past 13 years with the development of power from water-power, primarily, for the purpose of converting the water power into electrical energy. My experience in this line has been to a considerable extent in practically all of the western states.

Q. 5. Aside from your practical experience in hydraulic power generation, have you or have you not had any training in that direction by a course of study or otherwise?

A. I could best answer that by saying that any training I may have had by course of study would be of a very general and—as applied to real problems of hydraulic generation and transmission of power—of a general character rather than of a special character, because almost every problem or every case where water power is used for the generation of electric power there

are special detailed requirements which are of greater importance than that which could possibly be covered by any general course of instruction given in any institution.

Q. 6. In your engineering courses of study did you or did you not pay attention to electrical subjects?

A. Yes; I paid attention to electrical subjects.

Q. 7. And read the text books on those subjects?

A. Yes sir.

Q. 8. Have you had any experience prior to giving your present deposition in connection with litigation involving alleged infringements of patents?

A. I have; yes sir.

Q. 9. Can you identify such experience by the case in which that experience was had?

A. One case, and, I should say, by far of the greatest importance and of the greatest engineering and electrical and mechanical importance was a case wherein the Otis Elevator Company was suing the Van Emmon Elevator Company for an infringement of a number of patents, and primarily a patent by Mr. Baxter.

Q. 10. Where was that suit brought, if you remember? That is, in what court?

Mr. Westall: Counsel for the defendant objects to the question as incompetent, irrelevant and immaterial.

A. I cannot answer that question. I don't know. I remember that the testimony was taken before Master in Chancery Heacock in the Federal building on Sansome street in San Francisco.

Q. 11. By Mr. Blakeslee: What general type of elevator was involved in those proceedings?

Mr. Westall: Counsel for defendant objects to that line of question as having absolutely no pertinence to any issue raised or which could be raised in the present case.

Mr. Blakeslee: The evidence that counsel for complainant is eliciting is for the purpose of laying the foundation for the further testimony of the witness as an expert.

A. The general type of elevator was especially the electrical elevator, both manually and automatically controlled. But there was in this case elevators of the hydraulic type, the control and operation of which was to be by electrical means, and the operation of electrical circuits and contacts, and controlling and operating devices.

Q. 12. By Mr. Blakeslee: Did or did not your testimony in that case involve these mentioned electrical factors?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. Yes sir.

Q. 13. By Mr. Blakeslee: In connection with your testimony in that case did you have occasion to examine any letters-patent of the United States?

Mr. Westall: The same objection is repeated.

A. Yes sir; quite a number of patents.

Q. 14. By Mr. Blakeslee: Have you examined the letters patent to Lyndon in suit in this case at bar—patent number 695220?

A. I have.

Q. 15. Have you familiarized yourself thoroughly with the disclosures and contents of the same?

A. I have examined the patent and studied the same, and believe that I fully understand the patent and the operation and construction of the mechanism and details therein mentioned.

Q. 16. I call your attention to Complainant's Exhibit C, and to the figure 1 of the Lyndon patent in suit, and I will ask you to tell me whether or not you can trace any analogy between the showing of that exhibit and the said figure in the patent.

Mr. Westall: Objected to as incompetent, irrelevant and immaterial, there having been no sufficient foundation laid for the introduction of the exhibit referred to, and it not having been shown to be an accurate diagrammatic representation of the parts shown in the patent in suit.

A. Figure 1 of the Lyndon patent and Exhibit C of the complainant, both, in substantially the same manner, represent diagrammatically the devices and electrical circuits of the device and mechanism described in the Lyndon patent; and after very carefully examining both figure 1 of the Lyndon patent and Complainant's Exhibit C, I find that the same numbers have been used in each to signify the various and different parts and elements of the complete device.

Q. 17. By Mr. Blakeslee: As to the forms and shapes of the features shown in both figure 1 of the patent in suit and Complainant's Exhibit C, do you or do you not find comparative differences?

A. I find comparative differences only due to the representation of figure 1 of the Lyndon patent in what is commonly known as perspective, while in complainant's

Exhibit C the various elements of the complete operating device are shown in plan or in elevation, and the electrical circuits of figure 1 of the Lyndon patent by the curved or irregular lines representing the wires, while in Complainant's Exhibit C such circuits or wires are represented by straight lines.

Q. 18. More particularly or further I was inquiring as to the structural elements and mechanical parts. Now, comparatively, do you or do you not find differences as between these two drawings?

Mr. Westall: Counsel for the defendant objects to the question as having been already fully answered by the witness, and also that it amounts to cross-examination of the witness.

A. I could best answer that question by saying that I find no differences except that which would be apparent from the fact that figure 1 is shown in what is known as perspective, while Complainant's Exhibit C is shown in plan.

Q. 19. By Mr. Blakeslee: Then am I to understand that what is shown in figure 1 of the patent in suit is likewise fully shown in Complainant's Exhibit C.

Mr. Westall: Objected to as having been fully answered.

A. Yes sir. That is a proper understanding of my previous answers in connection with this matter.

Q. 20. By Mr. Blakeslee: Will you now please state with as much brevity as possible, taken in connection with completeness, the construction and operation of the mechanism or apparatus disclosed in the patent in suit,

together with the general interrelation of the parts and features thereof?

A. Referring especially to the representations as set forth in figure 1 of the Lyndon patent, I shall first attempt to as briefly as possible describe the elements as represented in figure 1, without reference to the numbers. There is there shown a wheel or turbine driven by water. Primarily the complete system is intended and, in my opinion, will satisfactorily operate to modify the amount of water admitted to the water wheel through its wheel-gate, and during such modification or change of the amount of water so admitted, there is also operated and water flowing into the by-pass in all instances, so that where there is a material change in the amount of water delivered to the water wheel through the wheel-gate, there is an inverse change in the amount of water which is allowed to go through the by-pass and not be admitted to or through its wheel-gate. The means employed to so inversely or in a contrarywise method change the amount of water delivered to the wheel, as compared with the amount of water which is allowed to by-pass, consists of certain mechanical shafts, gears, clutches and an electrical generator, the circuits from which are carried to various contacts, so that the variation of speed of the wheel due to any cause, but in practical operation primarily due to the change in the load upon the wheel, will automatically accomplish the result I have previously stated, namely: Where there is a material variation of the speed of the wheel, the amount of water delivered to the wheel through its wheel-gate is practically at the same time accompanied with a varia-

tion in an inverse way of the amount of water by a change in the by-pass valve and by-pass pipe.

Q. 21. Will you please designate separately by the reference characters on the drawing of figure 1 of the Lyndon patent in suit the several separate leading elements or groups of elements which are utilized in the performance of the operation or the production of the results you have specified?

A. The principal elements set forth in figure 1 of the Lyndon patent and, in an equivalent manner, set forth in Complainant's Exhibit C, consist of an inlet pipe 1 to a wheel -casing 2. The main shaft of the wheel is represented as 3. On one end of the wheel shaft 3 there is a beveled gear 4, at all times meshing and driving beveled gear 5, which is rigidly connected to the shaft 6, which causes pulley 7 to be driven at a speed which bears a definite relation at all times to the speed of the main water-wheel shaft. Pulley 7 is connected, as shown in figure 1, by the belt to a direct-current dynamo 8, of what is known, in general terms, as a constant voltage or constant potential type, by that meaning that as long as the speed of such direct current dynamo is maintained constant, the voltage of the current available from such dynamo is constant. From dynamo 8 there is a circuit carried to an element, as described by Lyndon in his patent, namely, a solenoid 33, which is in essence a controlling device. Now, as long as the speed of the dynamo remains constant, which it will if the speed of the main wheel remains constant, the electrical current in the controlling magnet or solenoid 33 is just of sufficient quantity so that the iron core 34 of solenoid 33 is not

moved at all. The position of this core 34 is controlled by two springs, one of which bears the number 37 and the other the number 38. Other essential elements of the complete system as described in the Lyndon patent pertains to the operation of the complete mechanism upon any variation of speed of the main water wheel shaft, as follows: Let us assume that the speed is increased, which would in practice be due to a reduction in load or the amount of work required at any particular time of the water wheel. Dynamo 8 is so wound and so designed that upon an increase of speed the voltage of this dynamo will be increased at a greater rate, or, in proportion, decidedly greater than such increase than such increase of speed. Lyndon in his patent describes the dynamo 8 as so constructed that the increase in the voltage of the current supplied from said dynamo will be practically in proportion to the square of the increase of the speed. Controlling magnet 33 is so connected by wires with dynamo 8 that as the voltage delivered by the dynamo is increased the core of the solenoid 33 will be drawn further within the magnet, which motion will be opposed by spring 38. Through suitable devices a lever arm 26, pivoted at 26a, is connected with the core 34 of the controlling magnet, and as core 34 is drawn by the increased voltage resulting in the increased current in the magnet 33, contacts 40 upon the upper end of the lever 26 will be moved so as to deliver electrical current from wires 93 and 92, also connected with the dynamo, to the wires 106, which lead to an electro-magnet 15. Electro-magnet 15 having current delivered to it will attract the armature 17 on the upper end of lever arm

14. Shaft 6 passes through two beveled gears loose upon this shaft, but which may be made to rotate with the shaft by means of a sleeve which acts as a clutch. As armature 17 is drawn toward magnet 15, it will cause one of these loose bevel gears 9 to 10 to rotate with the shaft 6. Bevel gear 9 will then be meshed with its mate bevel gear 11, which is rigidly and solidly connected with shaft 12, and shaft 12 through screw 18 will, if it is in motion itself, also set into rotation shaft 20. To return to the result when the speed is increased, bevel gear 11 will put in motion shaft 12 which will put into motion a sheave 54, which through suitable ropes, weights and casings, will operate on valve 48 in the by-pass 47, thereby modifying the amount of water flowing through such by-pass. At the same time through lever 43, which is actuated by the core 34 being drawn within magnet 33, circuits will be closed which will energize or cause electric current to flow in the coils of compensating magnet 64, which will attract the armature 63 on the end of lever arm 61, and cause bevel gear 21 meshed with 21a to rotate in such a direction as to reduce the amount of water delivered to the wheel, which will also result ultimately in the restoration of the proper speed. Other material devices are as follows: First, a so-called returning device, which is operated by a rod 25 upon which there are mounted springs 27, 28 and 29, which returning device is actuated by any movement of the lever arm 26. Lever arm 43 is so connected through a bell crank 42 that it makes no difference whether the core 34 is moved either within the controlling magnet 33 or its motion is to make it come out of the magnet. The lever arm

43 is moved in the same direction. And if it moves sufficiently far it will cause contact 45a to come in contact with 45 and complete the electrical circuit, and contact point 46a to come in contact with contact 46, finally **completing the circuit**, and it is to be noted that contact 45 and 46 are connected through wires to 102 leading to returning magnet 32. Returning magnet 32, if the current flows within it, will attract its armature 31 on the end of lever arm 41 pivoted at 24a, which by means of a yoke is connected to one-half of the sleeve clutch 23, which will cause it to come into contact with the other half 22, thereby giving it a slight rotary motion, and through the rod 25 will tend to restore equilibrium in the operation of the entire system as soon as uniform speed has been restored. There are certain contacts on the circuits leading to magnet 64, notably contact 75, which will be open if sheave 54, operating by-pass valve 48 is rotated to a sufficient degree, that will tend to prevent the wheel gate from being allowed to over-run as operated through bevel gears 21 and 21a. Similarly there are other circuit breakers as described by Lyndon leading to magnet 16, connected through wires 106, the circuit breakers being represented by arms 85 and 84 pivoted at 84a and 85a. Similarly his magnet 16, operating a clutch so connected through circuit breakers. I think I have described every important element in the mechanism with the possible exception that it is to be noted that on the lower end of lever arm 43 by the electrical connections contact 45a is duplicated at contact 100 and contact 46a is duplicated at contact 101; and, as Lyndon describes his patent, these contacts may be mercury cup contacts. It is evident to

one skilled in the interpretation of the operation of such contacts that, as desired, contacts 45 and 46 may be made to precede, if you please, the making of contacts to 103 and 104 which lead to circuit 105, and the operation of the compensating magnet 64. I should conclude by saying that the variation of the speed of pulley 7 which bears a very definite and absolute relation to the speed of the main water wheel shaft 3, will, through its variation, correspondingly, but to a greater extent, vary the voltage delivered by dynamo 8, and through the devices that I have described, if the speed of the main water wheel is increased or caused to increase, the result will be, first, that the supply of water will be reduced to the water-wheel, but at the same time, the amount of water allowed to go through the by-pass will be decreased. Contrary-wise, if an excessive load comes on the water wheel, causing the speed of the water wheel shaft to be decreased, the amount of water delivered to the water wheel will be increased, but there will be a decrease in the amount of water going through the by-pass, and the entire mechanism will be returned to equilibrium by the controlling magnet 33 just as soon as the proper speed or normal speed is maintained. It is manifest that the mutual operation of the amount of water delivered to the water wheel and through the by-pass will, through all the conditions of regulations, not materially and suddenly change the amount of water in the pipe line, and, therefore, the device eliminates the dangers resulting from the inertia of the water in the pipe line.

Q. 22. Now, as to the results following the decrease of speed of the shafts 3 and 6 and of rotation of the

armature of the generator 8, which of the magnets 15 and 16 is energized through the movement of the lever arm 36?

A. That is due to a decrease of speed in shafts 3 and 6?

Q. 23. Yes.

A. The decrease in the speed of shafts 3, 6, pulley 7, causes a reduction in the voltage supplied by dynamo 8.

Q. 24. And which of the magnets 15 and 16, responsive to the movement of the core 34, in that case will be energized by the movement of the lever arm 36?

A. The result of the movement of lever arm 26 due to the reduction of voltage in dynamo 8 will be that the core 34 will move out of controlling magnet 33. If it moves out sufficiently far it will make contact 41 and allow current to pass through contacts 41a. That will energize magnet 16.

Q. 25. And when magnets 16 are energized what will result?

A. When magnet 16 is energized it will attract armature 17 which, through the sleeve on the other end of lever arm 14, will tend to cause bevel gear 10 to rotate with shaft 6, and will cause bevel gear 11 meshed therewith to set into motion shaft 12, and, through worm 18, the screw gear on shaft 20, and reduce the amount of water going through the by-pass, and, at the same time, open up the wheel gate through gears 21 and 21a, increasing the amount of water to the wheel which will cause an increase in the speed of the wheel.

Q. 26. What is the nature of the contacts 40 and 40a,

and, similarly, the nature of contacts 41 and 41a, as specifically disclosed in the Lyndon patent?

Mr. Westall: The question is objected to as vague and indefinite.

A. To read from the patent on page 2, lines 45 and thereafter, "Contacts 40 and 41, at its", referring to lever arm 26, "respective ends, adapted to engage with contacts 40a and 41a connected to the respective magnets," and, not quoting from the patent, by respective magnets the specifications of the patent refer to the magnets 15 and 16. Or, to put it in another way, contacts 40 and 40a control currents to magnet 15; contacts 41 and 41a control the current to the magnet 16.

Q. 27. By Mr. Blakeslee: Now, is there any further disclosure in the specification or drawings of the patent in suit as to the form of contacts employed, namely, 40 and 40a, and 41 and 41a?

Mr. Westall: Objected to on the ground that the patent speaks for itself for what it contains.

A. There is in the drawing figure 6 a representation of contacts 40 and 40a, and 41 and 41a, which indicate that they are mercury contacts.

Q. 28. By Mr. Blakeslee: What results attach to the use of such mercury contacts at 40 and 40a and 41 and 41a, and at 45 and 45a, and at 46 and 46a, and at 100 and 103 and 101 and 104, as you have previously testified?

A. Being mercury contacts the relative length of the metal stem which enters into the mercury can be so adjusted as to get any sequence that is desired in the opening or closing of such contacts which would not normally

be as easily regulated if they were contacts made of solid metals only, such as copper or brass or platinum.

Q. 29. Can you testify of your own knowledge as to whether such mercury contacts were known and employed at the time of the application for the patent in suit, namely, in the year 1900, whenever their selection and use was for any reason desirable?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. There is no question that such mercury contacts were used for a great many years before the time of the application for the patent on September 13, 1900.

Q. 30. By Mr. Blakeslee: Due to the employment of these mercury contacts specified, or in their employment, what sequence of circuit closings through the magnets 15 and 16, and the magnets 32, and the magnets 64 takes place?

A. The sequence in the practical operation of the complete system would be the closing of contacts 40 with contacts 40a, or if the opposite result is desired to that which would come about by the closing of 40 with 40a, opposite result being the closing of contacts 41 with 41a, that would be the first result. That is manifest because either magnet 15 or magnet 16 will have to be energized before any mechanical motion whatsoever is transmitted to the shaft 12 and through shaft 12 to the shaft 20. Contacts 45a and 45, 46a and 46, will tend to close the circuit and send current through the returning magnet 32. Subsequently, if desired, 45a and 46a can be caused to close the circuit 105 leading to magnet 64, to contacts 103 and 104, magnet 64 being the compensating magnet which

operates solely upon the water gate, while magnet 32 through its armature 31 controls the motion either continued or intermittently to be transmitted to shaft 12. It should be stated here, to make clear that contact 45a and contact 100 are practically the same, being connected together electrically; similarly, contact 46a and contact 101 are practically equivalent, being electrically connected together.

Q. 31. Now, herefore, as to the sequence of energization of the magnets 15 or 16, as the first group, of the magnets 32, as the second group, and of the magnet 64, as a third group, what is that order of sequence in the operation of the apparatus of the Lyndon patent in suit?

A. The sequence would be either the energization of magnets 15 or 16 first; next, the energizing of magnets 32; and, finally, the energizing of magnets 64.

Q. 32. Now, will you please a little more fully describe the mounting of the shaft 20 and its operative relation to shaft 12 and the gate shaft b? You have testified that this shaft is operated to cause the gear 21 to mesh with the gear 21a. Will you please state in your answer, what, if anything, causes such motion?

A. Shaft 12 drives a portion of shaft 20 through worm wheel 18, screw 18 and worm wheel 19. Bevel gear 21, however, will not be rotated with shaft 20 unless compensating magnet 64 attracts its armature 63, thereby operating the disc clutch 58-57. Hence the name of magnet 64—"Compensating magnet".

Q. 33. Will you please refer to the specification of the Lyndon patent in suit and quote such portions there-

of as relate to the operation of gear 21 and of the clutch 58 and sheave 54?

A. Quoting from the patent at line 98 on page 1, "On the shaft 12 is mounted a worm 18 meshing with a worm wheel 19 on shaft 20. The shaft 20 also carries a bevel or spur gear 21 which meshes with another bevel or spur gear 21a situated on the shaft 21b, which operates the water wheel gate, (the latter not shown)".

Again, on page 2, line 78; "The double sheave or pulley 54 is mounted on shaft 20 so as to be free to rotate thereon, being held from endwise movements by collars 56. A clutch consisting of corresponding discs or cones 57, 58, respectively, and said sheave on hub 59, mounted on shaft 20 so as to move endwise, but compelled to rotate therewith by a spider connection 58a, enables the sheave to be clutched to the shaft, this operation being controlled by a lever 61 pivoted at 62 and having a fork engaging in an annular groove in said hub. The other end of this lever carries the armature 63 of the compensating magnet 64."

Q. 34. Now, when the sheave 54 is clutched, as described, to shaft 20 what takes place?

A. The by-pass valve 48 will be operated.

Q. 35. And what, if any, effect would that have upon gear 21?

A. I don't know that I can answer your question in any other way but to say that gear 21 is rigidly connected to shaft 20 and will naturally rotate with shaft 20 quite independent of whether the movable double sheave 54 is caused to rotate with the shaft 20 by the action of the clutch 57-58 or not.

Q. 36. Then how as to your previous testimony that the energization of the magnets 64, as I understood you, caused the gear 21 to be clutched with the gear 21a? Will you please state fully on this point?

A. If I said that the energizing of magnet 64 and the resultant action upon its armature 63 had any effect upon the motion of beveled gear 21, I made an erroneous statement.

Q. 37. And I understand that whenever shaft 20 turns, bevel gear 21 must turn and bevel gear 21a upon the other shaft 21b must also turn?

A. Yes sir.

Q. 38. Will you please point out the operation of the parts designated as 70 in the specifications and drawings?

Mr. Westall: Objected to. The patent shows for itself very clearly what parts are designated as 70 in the patent, and the pointing out by the expert cannot possibly make it any more clear.

A. In the drawings of the Lyndon patent parts 70 are best shown in figure 4. On page 2, line 92, we find the sentence: "On the ropes 51, 52, are lugs or clamps or stops 65, 66, adapted to engage under and lift weights 70, 70, when the sheave is turned either way from normal conditions, these weights being guided in casings 69 on a suitable fixed support and means may be provided for easing off the descent of these weights if desired. For example, the casings 69 may constitute dashpots."

Q. 39. By Mr. Blakeslee: Now, what will the effect of this combined weight and dashpot operation be with respect to the by-pass valve?

A. The effect of the weights and dashpot effect will be to slightly delay any motion transmitted to the by-pass valve 48 through the partial rotation of sheave 54 caused by the clutch 57-58 being operated through the attraction of the armature 63 by the compensating magnet 64.

Mr. Westall: Counsel for the defendant objects to the begging of the question by calling the action of the weights a dashpot effect.

Mr. Blakeslee: Attention is merely called to the preceding answer of the witness which fully points out this action quoted from these specifications.

Q. 40. By Mr. Blakeslee: Now, when the circuit is broken through the electro-magnets 64, what will be this combined dashpot and weight action on the by-pass valve?

Mr. Westall: Objected to upon the ground that it has not been shown that its effect is a dashpot effect.

A. I can best answer your question by quoting a paragraph found in the patent on page 4, beginning with line 99 and ending with line 105, which reads: "When the governing is completed, the controlling solenoid allows the lever 26 to return to normal position, the circuit of the compensating magnet is broken by the return of rod 36 and lever 43, and the butterfly valve returns slowly under the influence of its weight 70 to normal position." The effect of weight 70 and the casing in which they operate, 69, being to prevent rapid and sudden motion of the butterfly valve 48.

Q. 41. By Mr. Blakeslee: Now, will you please state what the sequence of de-energization is as to the groups first, magnets 32, second, magnets 64, and third, magnets

15 or 16, in the operation of the apparatus of the Lyndon patent in suit?

Mr. Westall: Counsel for the defendant objects to the question as being thoroughly covered by the prior explanation of the witness as to the operation of the patent in suit and being mere repetition.

A. Referring to the patent itself, line 104 on page 1—

Q. 42. By Mr. Blakeslee: Pardon me. If the witness will permit, I will call attention to the fact that I am not asking him how the sequence takes place but merely as to what the sequence is, namely, the order of precedence of the several de-energizations.

A. The sequence would be to de-energize either magnet 15 or 16 first which sets the governor in operation, and then to de-energize the magnet 32, and then subsequently 64.

Q. 43. You have testified that the circuits are completed through the mercury contacts controlling the magnets 32 and 64 subsequent to the completion of the circuits through the mercury contacts controlling either the magnets 15 or 16. What bearing has this upon this kind of sequence of de-energization of the several groups of magnets through these mercury contacts which you have described?

A. It has this bearing: That the operation of lever arm 26 through its being connected flexibly by springs through the loosely mounted clutch part 22a, lever arm 26 will be returned to its original position, thereby effecting contacts 40-40a or 41-41a, and, indirectly through the bell crank 42, actuating contacts 45 and 45a, 46 and 46a, 100 and 101, 103 and 104.

Q. 44. Now, assuming that the contacts 40 or 41 were more deeply immersed in the mercury contact 40a or 41a, with relation to the immersion of the contacts 45a in the mercury contacts 45, or with relation to the immersion of the contacts 100 in the mercury contacts 104, or the contacts 46a in the mercury contacts 46, or the contacts 100 in the mercury contacts 103, at which groups of contacts are the circuits first broken at the groups 40 and 40a or 41 and 41a or at the groups just otherwise designated?

A. The circuits would be opened earlier at groups 45a, 45, 46a, 46 and 100, 103, and 101, 104.

Q. 45. Now, under these conditions which magnets would be de-energized first, the magnets 15 or 16 or the magnets 32, or the magnets 64?

A. Magnets 32 or 64 would be de-energized before magnet 15 or 16.

Q. 46. Then do you find anything in the specifications or drawings of the Lyndon patent in suit which is contrary to the sequence of the de-energization as just testified, namely, that magnets 32 and 64 are de-energized prior to the magnets 15 or 16?

Mr. Westall: That is objected to on the ground that the patent speaks for itself and on the ground that the question calls for evidence which is not the best evidence.

A. I find nothing in the specifications whatsoever.

Q. 47. By Mr. Blakeslee: My question was if you found anything contrary to it?

A. That is what I meant. I find nothing contrary to the sequence which you describe.

Q. 48. Now, with respect to the actuation of the sev-

eral working parts of the apparatus disclosed in the Lyndon patent in suit, where that actuation is produced consequent upon the motion of the parts so set into motion by electro magnetic means, what have you to say with respect to the positiveness of such actuations in comparison with actuations caused entirely mechanically.

Mr. Westall: I object to the question as incompetent, irrelevant and immaterial, and as not affecting any issue involved in this case.

A. The positive actuations of the various parts as described in the Lyndon patent, which even in the Lyndon patent are evidently mechanical, are, in the same way positive as if the actuations were entirely mechanical and not originally caused by electro magnetic means. In other words, the electrical details or elements in the Lyndon patent serve solely to ultimately produce mechanical action.

Q. 49. By Mr. Blakeslee: Now, if the actions were all mechanical in this apparatus of the Lyndon patent in suit, what have you to say as to the element of lost motion or slippage as compared with such element, if present, in the apparatus organized as disclosed in the Lyndon patent?

A. I really don't know how to answer that question as to whether there would be any difference as regards slippage or lost motion as far as the ultimate results are concerned. In my opinion there would not necessarily be any essential difference.

Q. 50. As between a construction in which a part B is actuated from a remote point A through an electromagnet, and an electrical path, and a construction in

which the part B is actuated from a remote point A through a plurality of connected mechanical parts, in which construction would you expect to find, if in either, the greater amount of slippage or lost motion?

Mr. Westall: Objected to as already having been fully answered by the witness in the previous answer and also as being incompetent, irrelevant and immaterial.

A. I would not expect to find necessarily any difference, because of this fact: In the Lyndon patent—

Q. 51. By Mr. Blakeslee—(Interrupting): Pardon me. Please in this answer confine yourself to that hypothesis. I am not referring to the Lyndon patent.

A. Oh, I see. I beg your pardon. Because the desired regulation for constant speed of the water driven wheel is accomplished solely and only by mechanical means, the introduction of electrical devices being in my opinion merely incidental to the production of the results through mechanical motion—

Q. 52. (Interrupting) I will ask the witness to please answer the question as put, if it is clear to him, and, if not, to so state. And I call his attention to the fact that I am not asking him to testify as to water wheels or any other definite apparatus, but merely asking him to answer as to the pre-supposed imaginary condition such as is specified in the question.

Mr. Westall: The same objection is repeated.

A. In answering the question I have introduced purposely the word “Necessarily” but I think I should expect to find more lost motion or slippage of the part B where operated from a remote point A mechanically, than if some intervening electrical system were introduced.

Q. 53. By Mr. Blakeslee: Am I right in understanding from your previous testimony that you have had practical experience and practically observed the operation of water wheels?

A. Yes sir.

Q. 54. And have you had actual experience with and practically observed the operation of water wheels?

A. Yes sir.

Q. 55. Will you please tell us about those conditions which obtain in penstocks or water supply pipes leading to water wheels and supplying the actuating head of water?

A. In my experience with hydro-electric plants the actual conditions are in almost every case that the mass of water in the penstock or pipe line has inertia, and if the quantity of water delivered from such pipe lines is suddenly changed for any reason, either in an attempt to get a practically uniform constant speed under varying loads or for other reasons, the inertia of the water in the pipe lines or penstocks in motion, if arrested or accelerated, will introduce very undesirable, and, in many cases, dangerous stresses, particularly in the pipe line or penstock, and in the operation of hydro-electric plants, therefore, the conditions that I have described should be prevented for safe and reliable operation of such systems.

Q. 56. Please state whether the installation and use of apparatus such as disclosed in the Lyndon patent in suit bears upon the inertia and other conditions in the water supply pipe or penstock with respect to the water wheel control, protection of pipe line and the like parts?

A. The bearing which the devices as disclosed in the

Lyndon patent has upon the inertia of the water in the pipe lines is direct, in that the giving of constant speed of water wheel, and therefore, the load carried by the water wheel, whether an electrical generator or other power-consuming device, can be accomplished by the use of a by-pass so that sudden changes in the velocity of water flowing in the pipe line or the quantity of water flowing in the pipe line are prevented, and the disclosures in the Lyndon patent indicate the proper and very decidedly advantageous methods of so governing and not at the same time interfering with the flow of the water in the pipe line, in that the operation of the by-pass, if it is desirable to operate it at all through excessive changes in the load, is always inversely or contrarywise to the corresponding variation of the wheel gate admitting water to the wheel itself.

Q. 57. As to which set of conditions is the utilization of the by-pass more important, if under either, when greater or smaller movement of the gate valve or the water gate takes place?

A. The operation of the by-pass is especially important in large or great or excessive variations in the load which, in turn, momentarily, at least, will cause excessive changes in speed.

Q. 58. When the water gate is moved toward closed position what, due to the inertia of flowing water in the supply pipe, is the effect upon the velocity of the water passing the gate?

A. Momentarily closing the gate will tend to increase the velocity, due to the reduction of the area of the opening.

Q. 59. And what effect does this have upon the wheels to which the water is passed?

A. It tends to increase the velocity of the parts of the wheels which is exactly what you do not want to have happen at that instant.

Q. 60. And in this connection how does the by-pass of the Lyndon appartus act?

A. The operation of the by-pass naturally tends to keep as nearly uniform as may be the orifice, thereby eliminating that momentary increase in the velocity of the water in the main pipe line.

Q. 61. By "orifice" what do you mean in the last answer?

A. The opening through which the water flows.

Q. 62. To the wheel, do you mean, in that connection?

A. Yes, sir.

Q. 63. When the by-pass is open upon the moving of the gate towards closed position, do I understand that there is any effect produced by the movement of the by-pass with respect to the orifice, being the passage past the water gate itself?

A. No, sir. The area or opening through which the water goes through the by-pass would not necessarily and does not affect the area of the opening through which the water goes to the water gate itself.

Q. 64. And now how as to the total area of the opening past the water gate and the opening past the by-pass under these conditions?

A. The operation of the by-pass tends to make the total opening of the two constant—the same as the sum of the two openings constant.

Q. 65. And that acts how upon the velocity of the water passing the water gate?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. It tends to maintain conditions uniform.

Q. 66. By Mr. Blakeslee: Now, when the water gate is moved away from closed position, how does the by-pass valve operate?

A. It tends to move toward closed position or in the opposite way.

Q. 67. What effect does that have with respect to the velocity of water passing the water gate?

A. Since the aggregate or sum of the openings of the water gate and the by-pass remain practically constant, it tends to maintain the velocity of the water through the water gate opening uniform, and—

Q. 68. And this maintenance of constant velocity conditions applies then in both cases, do I understand? That is, upon the movement of the water gate to and away from closed position?

A. Yes, sir.

Q. 69. In which case, if either, can you say do the more extreme effects occur with respect to the velocity affecting the water wheel? When the gate is moving toward closed position or away from it?

A. I should say when the water gate is moving away from closed position, or opening wider.

Q. 70. Would the length of pipe line and head of water make any changes as to these matters last inquired about?

A. Yes, sir.

Q. 71. What changes?

A. The length of the pipe line would increase the mass of water in motion. If the comparative size of the pipes were the same it would increase the mass directly as the length, while the increase of head would increase the pressure. So the higher the head the longer the pipe line the more serious would be the effects of inertia, as has been set forth in the questions and answers.

Q. 72. And with a long pipe and greater head would the velocity of water passing the gate on its movement toward closing position be greater than would a shorter pipe line and a lesser head?

A. It would be greater with the higher head and longer pipe line.

Q. 73. And, conversely, would the retardation of the water upon opening of the water gate wider be more pronounced or less pronounced with a longer pipe and higher head?

A. It would be more pronounced. The retardation would be more pronounced with the longer pipe line and higher head.

Q. 74. And which condition, increase of velocity or retardation, if either, do you consider more necessary to correct by the use of the by-pass such as that disclosed in the Lyndon patent in suit with respect to maintaining constant wheel rotation speed and preventing dangerous stresses in the water supply pipe?

A. I should say that the greater dangers would result from sudden retardation.

Q. 75. And upon which motion of the gate valve?

A. Upon its sudden closing or consequent reduction of the motion through the pipe line.

Q. 76. With the longer pipe line and the higher head,

on the one hand, and the shorter pipe and the lower head on the other hand, in which of these conditions would you find greater retardation of the flow of water in the supply pipe or penstock?

Mr. Westall: Counsel for the defendant objects to the question as dealing with matters of theory that are not pertinent to any of the issues involved in this proceeding.

A. I would say the greater retardation would be with the longer pipe and higher head.

Q. 77. By Mr. Blakeslee: And for what reasons, please?

Mr. Westall: The same objection is repeated.

A. The motion of the water through the pipe line at any given velocity is to be compared with the amount of energy represented by the motion of a train of cars and engine. The longer the train and the higher the velocity of the water, any given closing of the outlet will naturally cause a greater effect, because the water in motion cannot be suddenly stopped any more than a train of cars can be suddenly stopped. The faster the water is going the more serious will be the consequences of attempting to suddenly retard the motion of the column of water.

Q. 78. By Mr. Blakeslee: Then in a pipe of given length if the head be increased there will be an overcoming of the retardation of the flow at the delivery end of that pipe. Is that correct?

Mr. Westall: Objected to as leading. The further objection that it is incompetent, irrelevant and immaterial.

A. I should say there would be a greater retardation on account of the increased head.

Q. 79. By Mr. Blakeslee: And why?

A. Because as the head increases for any given opening the amount of water delivered by the opening will be greater and the velocity will be greater.

Q. 80. And am I to understand that that will produce a greater retardation of the flow of water at the discharge end of the pipe?

A. If the water gate is closed or being closed the amount of water that is to be delivered will be reduced, and that means necessarily a retardation or stopping or slowing up of the entire column of water.

Q. 81. And what effect upon the speed of the water passing the gate?

Mr. Westall: Objected to as having already been answered by the witness and amounting to cross-examination of the plaintiff's own witness.

A. The effect would be to momentarily very materially increase the retardation.

Q. 82. By Mr. Blakeslee: My question was as to the effect upon the velocity of water passing the gate under these conditions and not upon the water held back by the gate.

Mr. Westall: The question is objected to as having been already several times answered by the witness. Objected to as very grossly leading and having been fully answered by the witness.

A. It would tend to increase the speed of the water passing the gate.

Q. 83. By Mr. Blakeslee: Now, under these same conditions, if the gate be moved away from closed position will there be lesser or greater retardation of the column of water with a relatively higher head?

A. If the gate is being moved away from closed posi-

tion, momentarily the speed of the water through the water gate will be reduced, but the ultimate result will be not the retardation of the flow of water in the pipe line itself.

Q. 84. And, therefore, with a higher head when the gate is so open will there be a lesser or greater retardation at the gate?

A. There would be no greater retardation at the gate if the head is increased.

Q. 85. With a pipe of given length under low head, and a pipe of the same length under a higher head, in which instance does the velocity reach the maximum earlier, and in which instance does it reach it later, when the gate is opened?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. It reaches its maximum velocity earlier the higher the head.

Q. 86. By Mr. Blakeslee: And how does your illustration of the inertia of a train of cars apply to this answer?

A. My analogy of the train of cars does not apply to this answer because in using that analogy I was considering and, in your question, you stated a greater length of pipe line, which would naturally mean a greater mass of water.

Q. 87. But with a pipe line of the same length and a greater head now does this analogy jibe?

A. I think the way your question is put the analogy would not apply in this case.

Q. 88. Then please give us an analogous case which will fit in this instance.

A. I should say the analogy would be represented by the comparison of the effect of the same train of cars running first at a low speed and then running at an exceedingly high speed, and the effect would be to obtain a maximum earlier at the higher than at the low speed, and corresponding to the same length of pipe line, in the one case with a low head and in the other with a high head.

Q. 89. And, to go further, how as to a train moving over tracks of two inclinations, one greater than the other?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial and as having been previously fully answered.

A. The effect would be the greater the greater the inclination.

Q. 90. By Mr. Blakeslee: Corresponding to which head in the pipe line, the greater head or the lesser head?

A. Corresponding to the greater head with the same length of pipe line.

Q. 91. Can you recollect in your experience any occurrence or incident wherein damage occurred because of lack of provisions of any by-pass governed to operate inversely as to the movement of the water gate?

A. Yes, sir.

Q. 92. Please tell us about it.

A. In one installation under a 1400-foot head without any by-pass whatever, the amount of water delivered from the pipe line was suddenly decreased, resulting in the bursting of the pipe line. I remember another instance in Tuolumne county of the same thing occurring with a pipe line under a 1000-foot head. I happened

to be present at the last occurrence. And I have heard of many instances where the sudden closing of the outlet at the lower end of the pipe line has resulted in sudden stresses in the pipe line resulting in the bursting of the pipe line in one or more places.

Q. 93. Now, if apparatus comprising a jointly governed water gate and by-pass valve constructed to embody the invention of the Lyndon patent in suit had been present in either of these installations, what would have been the result?

A. The result would have been that in the too sudden closing of the water opening to the water wheel or water gate it would not have resulted in suddenly reducing the velocity in the pipe line but would only have resulted in increasing the by-pass discharge, thereby practically maintaining uniform the velocity in the pipe line. I think that would apply in every one of these cases.

Q. 94. Did these breaks coming within your knowledge entail loss or expense to the owners of the plants concerned?

A. Very serious loss not only in cost of repairs, but much more seriously in the shutting down of the plant.

Q. 95. Can you give the names of these plants and their specific locations?

A. The San Joaquin Light & Power Company in Fresno county is the first one to which I referred, and the Tuolumne county Electric Company is the second one to which I referred, at which latter place I was present when it resulted in the breaking of the pipe line itself. In both places I know the plants were shut down for a long time.

Q. 96. What would you estimate as an engineer as the expense or loss—I may say overhead loss—resulting from the suspending of operations and so forth resulting from these breaks in these instances that you have testified to?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. I cannot of my own knowledge testify as to the cost of the break in the pipe line of the San Joaquin Light & Power Company in Fresno county, but I know of my own personal knowledge that the loss by the breaking of the pipe line in the Tuolumne Electric Company in Tuolumne county was between \$18,000 and \$20,000, both for repairs and consequences of cessation of operation.

Q. 97. By Mr. Blakeslee: Can you state what the capacity of this latter plant was in kilowatts?

Mr. Westall: The same objection.

A. The capacity of the latter plant was 1500 horsepower.

Q. 98. By Mr. Blakeslee: Were there any unusual circumstances at this plant or conditions which tended to increase this expense or loss or damage, over and above what might be said to be normal or usual?

Mr. Westall: The same objection.

A. No; I think no unusual conditions whatsoever.

Q. 99. By Mr. Blakeslee: How long have you known Mr. George J. Henry, Junior, the complainant in this case?

Mr. Westall: The same objection.

A. Twenty-one years.

Q. 100. By Mr. Blakeslee: In summary, what have

you to say as to his general standing and ability as a consulting and installing or contracting hydro-electric engineer?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

Q. 101. By Mr. Blakeslee: And also as a designer of hydraulic apparatus for water wheels and the like?

A. I am personally familiar with the work of Mr. George J. Henry, Junior, in the designing and constructing of water wheels, and know of my own personal knowledge that he has been one of the principal men who have developed during the last 20 years the most efficient types of water wheels and water wheel turbines as well as the most efficient and satisfactory pressure pipe lines and methods of regulating and controlling the delivery of water from such pipe lines to water wheels for the generation of power.

Q. 102. Aside from the invention and apparatus disclosed in the Lyndon patent in suit, do you know of any apparatus providing a governed by-pass valve operating inversely to the water wheel gate and which has been in use under your observation?

A. Yes, sir.

Q. 103. What one was that?

A. The one that I think of first is that which was developed by the Pelton Water Wheel Company, and one also developed by the Doble Water Wheel Company, which company I think is out of existence at the present time, for the control of high head pipe lines, in a number of instances.

Q. 104. When did you observe such use?

A. I can't remember the very first observation, but

it was, as I recall it, about 1905 or '6 in a number of the plants on the Pacific Coast.

Q. 105. Do you know whether any of these are in operation today?

A. I am not certain. I believe that they are in operation, or modifications of them, such modifications having been made since that time.

Q. 106. And did both of these apparatus utilize the invention as you have discussed it in analyzing the Lyndon patent in suit?

A. Yes, sir.

Q. 107. Now, in such apparatus, state, if you know, whether it would be possible to set the by-pass valve so as to discharge water either when the water gate was closed or open?

A. Yes, sir.

Q. 108. Would that be possible in using the Lyndon patent apparatus as disclosed in the patent in suit?

A. Yes, sir; it would be possible.

Q. 109. And what would you do to so independently release and set the by-pass valve of the Lyndon patent in suit?

A. I would set the valve so that even in its position of most nearly closing there would still be water passing through the by-pass.

Q. 110. And could you disconnect the by-pass from the governor and the water gate so that it could be used independently in the Lyndon apparatus?

A. Absolutely so, yes, sir.

Q. 111. How would you do that, and illustrate following the drawings in the Lyndon apparatus?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. It could be done in a number of ways. Probably the simplest would be to eliminate either magnet 64 or some of the contacts leading thereto.

Q. 112. By Mr. Blakeslee: Do you know of any other water wheel apparatus excepting those Pelton and Abner Doble apparatus which you say included the Lyndon invention, in which it is so possible to free a by-pass from the governor controlling the same and the water gate so as to permit separate, independent discharge of the water at the by-pass?

A. I don't believe that I know of any other.

Q. 113. Can you state any utilization that could be made of water so passing the by-pass and disconnected from the water gate when, we will say, the water gate was shut down?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. To my own personal knowledge there are a number of ways in which the water going through the by-pass may be utilized, one of which is, if there is a plant lower down using the same water, and it is desired never to shut down the lower plant, no matter what had happened with the other. Another use and one that I remember in my own personal practice, is where water was to be by-passed for domestic purposes independent of the load or the amount of water sent through the water wheel itself. Another actual illustration which I have in mind, is over in Utah where water for irrigation is continuously by-passed. In other instances the utilization of the water for the generation of power was ar-

ranged by contract so that at all times certain water would be by-passed for the purposes of irrigation, independent of the amount of water desirable to send through the water wheels for the generation of power.

Q. 114. By Mr. Blakeslee: How is this independent supply of water for the purposes stated—domestic and otherwise—provided for in these plants which you mention?

Mr. Westall: The same objection.

A. I don't know that I know of my own personal knowledge exactly how water is provided for in these particular plants. I know of other plants that I did not have in mind in answering your former question as to how it is provided for.

Q. 115. By Mr. Blakeslee: And how is it provided for in other plants?

A. By the use of a by-pass similar to—actually installed by the Pelton Water Wheel Company.

Q. 116. And is that by-pass used for any other purpose?

A. It is used for the general purposes of regulating the amount of power generated from the water wheel, and independent of any serious modification in the velocity of water in the pipe line.

Q. 117. And in accordance or not in accordance with the Lyndon patent?

A. In exact accordance with the claims as set forth, or the specifications of the claims in the Lyndon patent.

Q. 118. When were those plants installed?

A. The particular one that I have in mind was installed during the past year or so and started up only a few months ago.

Q. 119. If such by-pass were not present in this instance what installation would be necessary to permit of such outflow of water with the gate valve shut down?

A. The only thing that I know of that could be done would be an actual waste of the water at all times.

Q. 120. And how could it be permitted to discharge?

A. It could be discharged by a waste gate at the head of the pipe line, and run by a natural channel.

Q. 121. Are you familiar at all with the operation of the electrically operated dredges?

A. Yes, sir.

Q. 122. What have you to say with respect to the load factor and fluctuations of load in such work?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. The variation of load is very great in the operation of dredges. I know particularly in my own experience with the dredgers in operation at Folsom—Gold dredgers, Oroville and general vicinity. The maximum load thrown upon the electrical transmission lines is at many times exceedingly great owing to the sticking on the buckets.

Q. 123. By Mr. Blakeslee: And that has what effect upon the speed and operation of the water wheel?

Mr. Westall: The same objection.

A. It tends to reduce the speed very suddenly and practically prevents the generators, unless they are exceedingly large as compared with the amount of load, from turning at all.

Q. 124. By Mr. Blakeslee: How does this affect the problem in such instances of governing the water wheel?

A. In my experience it means that the governing of

water wheels is practically impossible unless you have variable combination—variable opening of the water gate with a variable opening of the by-pass—the two operating and controlled by the governing mechanism, so that their relative opening and closing are inverse. In other words, the opening of the water gate occurring simultaneously with the closing of the by-pass gate, and vice versa.

January 23, 1914. A. M.

By Mr. Blakeslee:

*CLCory recalled
direct examination
resumed*

Q. 125. I show you an identified printed piece of paper, being Complainant's Exhibit Y, and I will ask you to examine the reverse side thereof where there are rate quotations, and to state, please, if you have ever had any experience in the calculation of electrical energy rates, and, second, if so, how these rates compare with current rates for electrical energy sold by corporations to consumers.

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. I have had experience in the proper determination of rates for electrical power and electrical service, and I have knowledge of rates for such service in a great many places on the Pacific Coast. Referring to the schedule of rates under the general heading "Rules" on the reverse side of the blank, being "Application for Lighting," to the board of public service commissioners, city of Los Angeles, Complainant's Exhibit Y, I would say that the schedule of rates there set forth is upon a basis of cost that is somewhat higher than the service charge in a number of the larger cities of which I have knowledge on the Pacific Coast, and, on the other hand,

it is about the same or perhaps a little less than rates of which I have knowledge in the smaller cities and communities on the Pacific Coast, that being on the basis of a face rate for the minimum consumptions of 9 cents per kilowatt-hour, gradually reducing to 5 cents per kilowatt-hour for all current in excess of 225 kilowatts in one month. Referring to flat rates, 2, 3 and 4—16 candle power lights, I should say that those rates are practically the same as some of which I have knowledge in the smaller communities of the Pacific Coast.

Q. 126. Are these rates which you have referred to as printed on this exhibit on the reverse side such as under usual conditions of operation and maintenance of plant and overhead charges would give a private corporation selling electrical energy at these rates a substantial profit?

Mr. Westall: Objected to as calling for evidence which can have no relevancy to any issue in this case.

A. In my judgment the rates are such as to be reasonably remunerative providing the company had a large enough business to justify the generation and distribution of a considerable amount of power. Equitable rates depend to a very considerable extent upon the amount of service rendered by any one organization, whether a private company or a municipality owned property, and, at the same time, upon the character of use of electricity.

Q. 127. By Mr. Blakeslee: Are you familiar with rates for electrical energy which consumers pay any California municipality other than the city of Los Angeles?

Mr. Westall: The same objection is repeated.

A. I am familiar with the rates charged in the city

of Alameda for service from its municipal plant; yes, sir.

Q. 128. By Mr. Blakeslee: How do those rates, approximately, compare with those under discussion?

Mr. Westall: The same objection.

A. The rates in vogue in the city of Alameda are somewhat less than these rates. I should say in general they are as much as 20 per cent less.

Q. 129. By Mr. Blakeslee: And do you know of your own knowledge as to whether or not the city of Alameda, California, is enjoying a profit upon its sale of electrical energy at the lower rates when all elements of operation, maintenance, depreciation and overhead expense or cost are taken into consideration?

Mr. Westall: The same objection is repeated.

A. According to my knowledge of the operation of the Alameda Municipal Plant for a number of years, I should say that at the lower rates there is certainly no profit. There seems to have been sufficient gross revenue to pay the expenses of operation.

Q. 130. By Mr. Blakeslee: And do those rates of the city of Alameda pay a return, to your knowledge, to the city sufficient to cover and provide for interest upon the investment in the generating plants?

Mr. Westall: The same objection.

A. In my opinion the rates are not sufficiently high to provide for proper return upon the investment.

Q. 131. By Mr. Blakeslee: What do you mean by the language "proper return?"

A. A proper return upon the investment includes interest upon the investment and a proper allowance for sinking fund for depreciation upon the various parts of the plant.

Q. 132. In other words, am I to deduce that they sell electrical energy of the city of Alameda's plants at or near the cost of production?

Mr. Westall: The same objection is repeated.

A. In my opinion those are the conditions under which the electrical energy is sold and the rates determined.

Q. 133. By Mr. Blakeslee: And if the rates for the electrical sold by the city of Alameda were 20 per cent higher, to conform substantially to the rates specified on Complainant's Exhibit Y, in your opinion and from your knowledge as to such matters would the items of interest on the investment, maintenance, depreciation and all overhead charges be provided for in the returns to the city, in addition to the base cost of the production of energy?

Mr. Westall: The same objection is repeated, and it is further objected that the witness is not shown by the record to be qualified to testify as an expert regarding the matters inquired of in the question.

A. I should say that if the rates in Alameda were, as your question indicates, namely, practically the same as those set forth on the back of Complainant's Exhibit Y, the gross revenue would certainly be sufficient to pay all of the fixed charges, including interest, depreciation and so forth, and I base my opinion upon my knowledge of the Alameda plant, having made during the past ten years not less than four reports upon its operation.

Q. 134. By Mr. Blakeslee: Were you or were you not remunerated for your services in preparing these reports?

A. I was.

Mr. Westall: Counsel for the defendant moves that the preceding testimony of the witness reciting the cost of maintenance and the amount of profit be stricken out as having been shown by his last answer that he relies on certain written reports which are not produced in evidence in this case.

Q. 135. By Mr. Blakeslee: In this connection, Mr. Cory, I will ask you if in the present instance in testifying as an expert for the complainant in this suit you are receiving any compensation or pay for such services?

A. I am not. It is not my understanding that I am to receive any compensation whatsoever.

Q. 136. Referring now to the Lyndon patent in suit and the matters concerned in your testimony of yesterday relating to sequences of energization and de-energization of the several groups of electro-magnets 15 or 16, 32, and 64, I will ask you what the effect of the governor upon the water gate through its shaft 21b will be in the governing action, assuming that the circuits through the electro-magnets 32 and 64 are broken prior to the breaking of the circuit through either group of electro-magnets 15 or 16, and that the voltage of the generator 8 has not returned to normal?

A. The effect of the governor upon the water gate under the assumption that there is no current flowing in the returning magnet 32 or the compensating magnet 64 prior to the return of the voltage of the generator 8 to normal will be that either magnet 15 or 16 will be attracting the armature 17 so that the water gate will either be in the process of being closed or open, depending upon whether the current is flowing in magnet 15 or is flowing in magnet 16.

Q. 137. And now let us assume that the normal voltage of generator 8 is further disturbed, either up or down, so that circuits are again closed through the electrical magnets 32 and 64 during the continuation of energization of either the magnets 15 or 16, what will next occur in the governing action?

A. The next action in the process of governing will be, depending upon the adjustment of contacts 45 and 46 as compared with the adjustments of contacts 103 and 104, that armature 31 will be attracted by returning magnet 32, thereby placing in operation the returning device which will ultimately open the circuit at coil 15 or 16. This action, however, of returning magnet 32 may be due to the adjustment of the contacts intermittently and not continuously. At the same time, either just a little later or just a little earlier, depending on which adjustment is desired, for the contacts 103 and 104 as compared with the contacts 45 or 46, compensating magnet 64 will attract its armature 63 and thereby place in motion through clutch 57, 58, the valve of the by-pass.

Q. 138. And, similarly, what have you to say as to the possibility of intermittent energization of electromagnets 64 and resultant intermittent action of the by-pass valve 48?

A. Magnet 64, due to the intermittent opening and closing of contacts 103 and 104, may also give to the compensating magnet 64 rapidly succeeding energizing and de-energizing which will result in intermittent rotation of the sheave 54 or not a continuous rotation, until the proper position is obtained of the valve 48 in the by-pass.

Q. 139. And under the conditions now being considered, am I to understand that these intermittent actuations of the returning device through the clutch 22, 23, and of the by-pass valve through the clutch 57, 58, may occur during a continued rotation of the shaft 20 acting to operate the water gate?

A. Yes, sir.

Q. 140. Now, when will these intermittent actions of the returning device and of the by-pass valve and constant actuation of the water gate be terminated?

A. As soon as the voltage of generator 8 has been returned to normal, due to the returning to normal of the speed of the main water wheel, as the result of the governing mechanism upon the water gate as well as upon the by-pass valve.

Q. 141. You testified yesterday somewhat as to mercury contacts provided in the circuits controlling the energization of magnets 15 and 16, the magnets 32 and the magnets 64. Can you produce any illustrative showing tending to assist in the consideration of these contact elements and their operation?

A. I think I could; yes, sir.

Q. 142. Please do so.

(The witness submits four blue prints lettered in the corners respective A, B, C and D.)

Q. 143. Will you please briefly state what these blue prints show with respect to the arrangement of these contacts and the various positions thereof relative to their making contacts, in the sequences of energization and de-energization of the groups of electro-magnets 15 or 16, 32, and 64, in line with your previous testimony?

A. Blue print A shows the contacts 40 and 40a, 41, 41a, 45, 46 and 45a and 46a, and 100 and 101, 103 and 104, all of these contacts being open.

Blue print B shows the same contacts with 41 and 41a closed and all of the rest of the contacts open.

Blue print C shows the contacts 41 and 41a closed somewhat more deeply than the contacts 41—immersed more deeply in the mercury contacts 41a—than shown upon blue print B, and also contacts 45a and 46a, 45 and 46, closed; contacts 100 and 101, 103 and 104, still being open, and, of course, contacts 40 and 40a being open because 41 and 41a are closed, the operation of the system being that either contacts 41 and 41a are closed and contacts 40 and 40a open, or, vice versa, except when the speed of the shaft of the water wheel is normal.

Blue print D shows contacts 41 and 41a still more deeply made in the mercury cups thereof, contacts 45a and 46a, 45 and 46, more deeply made than as shown in blue print C, and also contacts 100, 101, 103 and 104 also now closed; the only contacts being open, as there represented, being contacts 40 and 40a.

Referring to blue print A, none of the three magnets, namely, 15 or 16, 32 or 64, have current flowing within their coils, since the respective contacts are open.

Referring to blue print B, current will be flowing only in magnet 16, there being no current flowing in returning magnet 32 or compensating magnet 64, since the contacts are both open of these two latter magnets.

Referring to blue print C, there will be current flowing in the clutch magnet 16, in returning magnet 32, but there will be no current flowing in the coil of compensat-

ing magnet 64, since the contacts of the circuits leading to this magnet are open.

Referring to blue print D, current will be flowing in the clutch magnet 16, the returning magnet 32, and in compensating magnet 64, since the contacts are all closed controlling the current supplied to each of these three magnets.

Q. 144. Now, if in the several blue prints A to D under discussion, the lever arm 26 were so rocked that the contacts 40 and 40a were brought together instead of the contacts 41 and 41a, would or would not the same sequence of contacting conditions exist with respect to the other contact devices as you have just testified?

A. Yes, sir; the same sequence would be carried out, the only difference being that instead of contacts 41 and 41a being closed and supplying current to the clutch magnet 16, contacts 40 and 40a would be closed supplying current to clutch magnet 15.

Q. 145. Now supposing the depth of mercury in the pair of cups of the contacts 45 and 46 should be diminished and the depth of mercury in the pair of cups of the contacts 103 and 104 be increased, so that a reversal of depths as between said pairs of cups would result, referring now to the showing in the blue prints, what would be the effect with respect to the sequence of energization and de-energization through these pairs of contacts?

A. The sequence would be changed in that the current would be closed in compensating magnet 64 prior to the closing of the circuit leading to the returning magnet 32; while previously the reverse was true, namely, that current would be closed in returning magnet 32 prior

to the setting up of current due to the closing of contacts 103 and 104 in compensating magnet 64.

Q. 146. Therefore, what will be the effect upon energization with respect to the order of operation of the by-pass valve and of the returning clutch 22 and 23?

A. The increase in depth of mercury in contacts 103 and 104 will cause the by-pass valve to operate prior to the operation of the returning device acting upon the lever arm 26.

Q. 147. Now, as to the de-energization, will there or will there not be any variation from the direct order of reversal of energization consequent upon the varying depths of mercury contacts of these several contact cups?

A. No sir, the sequence of de-energization will be exactly opposite to the sequence of energizing, depending upon the adjustment of the depth of mercury in the contact cups.

Q. 148. Now as to these various parts shown in these blue prints A to D, that is, the mercury cups and their making contacts and the formation and construction thereof, such as would enter into their practical use, is there or is there not anything which is not well known in the art at the present time, and I mean in the art broadly of electricity and electro-mechanics, or was at the time of the date of the application of the Lyndon patent in suit well known in those arts, or the contrary?

A. They were well known and extensively used to my personal knowledge prior to either the application for or the granting of the patent.

Q. 149. And at the present day?

A. And at the present day; yes sir.

Q. 150. Where did you obtain these blue prints A to D?

A. They were handed to me by you a few moments ago.

Q. 151. Do you or do you not find anything in them which leads you to desire in any way to further amplify or change your previous testimony in any respect?

A. I find nothing whatsoever in them.

Mr. Blakeslee: The said four blue prints A to D are offered in evidence as Complainant's Exhibit AA, BB, CC and DD, respectively and we ask the Examiner to so mark the same.

Mr. Westall: Counsel for the defendant objects to the introduction of the blue prints referred to on the ground that they and each of them show certain parts and elements and devices which are not shown or described in the specifications or drawings of the patent in suit, and on the ground, therefore, that they are irrelevant to any issue in this case and are misleading as to the actual operation of the device shown, described and claimed in the Lyndon patent in suit.

The said exhibits are thereupon marked as Complainant's Exhibits AA, BB, CC and DD respectively by the Examiner.

Q. 152. By Mr. Blakeslee: I call your attention to the figure 6 of the Lyndon patent in suit, and I will ask you if you find therein anything which bears upon the subject of the mercury contacts which you have discussed in your previous testimony, and, particularly, with relation to the four exhibits just offered?

A. I do. Figure 6 is a representation of mercury cup contacts 40 and 40a, 41 and 41a, and 45 and 45a.

Q. 153. From your knowledge and experience as an electrical and mechanical engineer is there any doubt as to what the nature of these contacts is when taken in connection with the specifications of the Lyndon patent in suit?

A. There is no doubt whatsoever.

Q. 154. I will now show you Complainant's Exhibit E to P, inclusive, being photographs, and I will ask you if you have examined the same?

A. No; I have never seen these exhibits at all.

Q. 155. Please state in a few words your understanding of the showing of each of these photographs, taking them in the order of the designating letters?

A. Complainant's Exhibit E appears to me to be a photograph of an impulse water wheel directly connected to an electrical generator and equipped with a governor and governing device.

Exhibit F appears to me to be a photograph of various parts of a mechanism controlling the water gate and bypass valve.

Exhibit G, a photograph from another position of the water wheel and electrical generator, and the governing mechanism connected with the water wheel exhibited.

Exhibit H appears to me to be the photograph of a different water wheel directly connected to a generator and a different form of governor and governing mechanism of the water wheel.

Exhibit I is a photograph of the mechanism connection

with the operation of the water wheel having a water gate and a by-pass valve.

Exhibit J, another photograph of the same water wheel and generator as shown in Exhibit H, showing especially the water wheel governor.

Exhibit K is a photograph of a part of the same governor as shown in Exhibit J.

Exhibit L is a photograph showing especially the water wheel as shown in Exhibit J.

Exhibit M is a photograph of a power house.

Exhibit N is a detail view evidently showing the tail race and discharge from the same power house as shown in Exhibit M.

Exhibit O is a photograph of a dredger evidently working in a canal or conduit.

Exhibit P is a photograph of a hydro-electric power house.

Q. 156. I now submit to you Complainant's Exhibits U and V, and I will ask you if you can tell me what is shown in each?

A. Exhibit U is a drawing showing the mechanism connected with the operation of the water gate, the gate in this case being in the form of a needle valve, and a by-pass valve or gate, the needle valve being also the type used in the by-pass, a lever arm R connected through link Q with a crank T which is evidently capable of being rotated about shaft D by means of a crank and connecting rod in the latter, so that in the operation of the water gate it will be closed. Or in the act of being closed at the same time that the by-pass valve will be in the process of being opened, and vice versa.

Exhibit V appears to be a representation of a similar operating mechanism and water gate, the water gate valve, by-pass and by-pass valve, both the water gate valve and by-pass valve being of the needle type, so assembled that the operation of the lever arm KK about the shaft LL as a center will tend to close the water gate and at the same time act so as to open the by-pass valve, and also tend to open the water gate and at the same time close the by-pass valve, the operation of the water gate and the by-pass valve being contrarywise or inversely operative.

Q. 157. Referring to the parts on these exhibits U and V designated as oil dashpots, can you state what the functions of those parts are in these combinations?

A. The oil dashpots in both Exhibits U and V, and the springs contained within the dashpots, are evidently to prevent a too rapid operation of the by-pass valve.

Q. 158. And what do you make out as the function of the springs shown at the side of each of these dashpots?

A. The purpose of the springs, I presume, would be to tend to restore the by-pass valve to its normal position, and, at the same time, prevent too sudden shock or motion of the by-pass valve itself.

Q. 159. What do you make out is the function of the parts marked "adjusting screws" in connection with these dashpot illustrations?

A. The function of the adjusting screws is, I assume, to control the rapidity of the operation of the dashpot, or control the operation of the by-pass valve stem,

through the relation of the adjusting screws to the oil dashpot itself.

Q. 160. If the circulation of oil or other fluid in these dashpots is retarded, what will be the effect upon the responsiveness of the by-pass valve to the governing action?

A. The tendency will be to make the governing of the by-pass valve more slow or tend to retard its operation, although not at all to prevent its ultimate operation to the limits desired. It introduces what is known as the time element or delay in time in the operation of the by-pass valve. If the flow of the oil or liquid in the dashpot is retarded by the adjustment of the screws, it would tend to increase the time element required for the operation of the by-pass valve or to make it operate more slowly.

Q. 161. And do I understand that the by-pass valve is directly actuated through the dashpot?

A. No; it is not directly operated through the dashpot except by the springs, which, in Exhibit V are represented by WW, and the springs merely act as a sort of a cushion.

Q. 162. It is my understanding of your previous testimony that the springs acted to return the dashpot to normal position. Is that a correct understanding of your testimony?

A. Yes; that is what I stated in my testimony, and I am not absolutely certain upon preliminary investigation as to whether that is true or not.

Q. 163. And I further understand that the dashpot with its oil circulation affects the operation of the by-pass needle. Is that correct?

A. It affects the rapidity with which it operates.

Q. 164. Now, let us assume that the part which I have marked in pencil 2 in Exhibit V is pivotally connected at one end at the point which I mark in pencil figure 3, to the stationary by-pass nozzle, such part 2 playing through an opening in a lug which I similarly mark 4, fixed to the side of the dashpot casing, and that the springs surround this part marked 2 between the fixed lug 4 and nuts which are similarly marked 5 on the end of part marked 2. Under those conditions what will be the action of those springs? I will further qualify this question by assuming that the dashpot casing is pivoted at the point I similarly make 6, to the rearward or inner end of the by-pass valve which I similarly mark 7?

A. The tendency of the springs would be, as is often expressed, to cushion the transmission of action of the arm UUU to the by-pass valve and, in effect, would cause the transmission of such motion from UUU to be somewhat intermittent.

Q. 165. Now, let us further assume that as you draw upon the by-pass valve to move it away from its seat, the springs upon the part 2 are compressed between the lug 4 and the nuts 5. What will be the action of these springs with reference to the dashpot and the by-pass valve?

A. The action of these springs will be to transmit the motion to the dashpot, not rigidly, but to allow a certain compression of the spring before the relative motion is transmitted to the other part.

Q. 166. Now, let me point out further that I am assuming that the part 2 plays endwise through the lug

4 relatively, or that upon movement of the dashpot the lug 4 rides along the part 2, the nuts 5 being mounted upon part 2, free of anything else. What will be the action of the springs upon the dashpot and by-pass valve when the governing action ceases?

A. The action of the spring when the governing action ceases will be to retard the restoration of the by-pass valve to its former or normal position.

Q. 167. Now, I possibly should further state that the springs shown are compressed upon the movement of the by-pass valve away from its seat, when so pulled away through the dashpot. Assuming that, what will be the action of the springs upon the by-pass valve when the governing action has ceased?

A. The tendency of the springs will be to expand, overcoming their previous compression, and to move the by-pass stem in an opposite direction for a slight distance.

Q. 168. And that direction will carry the by-pass valve how with respect to closed positions?

A. I do not recall in what way you presumed the by-pass valve to be acted upon, whether it be open or closed.

Q. 169. Assume that the by-pass valve is opened through its stem and the dashpot compressing such springs?

A. Then the tendency will be for the springs to recover from their compression and to open the by-pass valve, if it was closed before.

Q. 170. I am assuming that it was first open.

A. If it is first open then the tendency will be for the springs to be restored from their compression and for

the by-pass valve, where first open, the tendency would be for it to slightly close.

Q. 171. Now, taking up again the action of the dashpot, we will assume that the piston in the dashpot is rigidly connected to the part marked UUU. If the flow of fluid in the dashpot between the spaces at opposite sides of the piston therein be retarded, what will be the result with respect to the responsiveness of the by-pass valve to pull upon the part UUU, tending to open the by-pass valve?

A. It will be retarded also.

Q. 172. Under these conditions would the by-pass valve move away from its seat quicker or slower?

A. More slowly.

Q. 173. Now, comparing the rate of motion of the by-pass valve away from its seat with the rate of motion of the part UUU, governing the first motion mentioned, will that first motion mentioned be quicker or slower when the flow of oil in the dashpot is retarded?

A. It will be slower.

Q. 174. When the flow of oil in the dashpot is retarded what will be the effect upon the movement of the piston in the dashpot?

A. The movement of the piston will be delayed; it will move more slowly with any given force applied at UUU.

Q. 175. But if the piston is on the part UUU rigidly, will it not move with the part UUU?

A. As far as the piston is concerned, yes sir.

Q. 176. And if the fluid is retarded in its flow within

the dashpot how will the speed of movement of the piston in the dashpot be affected?

A. It will not be affected at all, because the movement of the piston is controlled from the lever arm KK.

Q. 177. I mean by the speed of the movement of the piston, how will the play of the piston in the dashpot casing be affected if the flow of oil in the dashpot casing be retarded?

A. The play of the piston within the dashpot will be retarded if the flow of oil is retarded.

Q. 178. And if the piston is forced to move by the part UUU, what will be the effect upon the dashpot casing and upon the by-pass valve stem 7 connected therewith at 6?

A. The movement of the by-pass stem will be retarded by closing up or reduction of the amount of flow allowed in the dashpot cylinder.

Q. 179. If, as we assumed, the piston is moving at the same rate as the part UUU and the flow of oil is retarded in the dashpot casing so that the dashpot casing moves more nearly in step with the piston, will the by-pass valve stem 7 tend to move more nearly at the rate of the piston or the contrary?

A. The greater the flow of oil from the two sides of the piston is retarded, the more nearly will the valve stem move with the part UUU. Or, in other words, if there was no opportunity for the oil to be transferred from one side of the piston to the other, then the by-pass valve would necessarily move absolutely with UUU. On the other hand, if there was free flow of the oil from the two ends of the dashpot cylinder to either side of the piston,

then the piston would move within the cylinder through the oil and would not cause a corresponding motion of the by-pass valve stem.

Q. 180. Now, if there were nothing in the dashpot casing opposing the movement of the piston therein, or if that motion were but slightly opposed, and a sudden closing of the water gate were caused, what would be the effect upon the pipe line or upon the penstock of the water wheel to which the governor shown in plaintiff's Exhibit V was applied?

A. The effect would be to stop the flow of the water in the pipe line, and, if it were done quickly enough, it would produce very serious stresses and tend to burst the pipe line.

Q. 181. And why?

A. Because there is no opportunity for the water which is flowing at a given velocity normally to come out of the pipe line because of the closing of the water gate and because there would be no tendency to open the by-pass valve, since the piston connected with UUU would simply move within the dashpot cylinder and not transmit its motion to the by-pass valve.

Q. 182. Now, in a given hydro-electric plant where service to electrically operated dredgers is maintained, and where from water causes or by other consumptions rather extreme fluctuations in the load takes place, what would be the proper conditions to maintain as to the freedom of the piston to play within the dashpot casing?

A. Under such conditions where the load upon the water wheel is subject to very wide and sudden fluctuations the proper condition to maintain would be to retard

the motion of the oil in the dashpot tending to bring together the opening of the by-pass valve coincident with the tendency to close the water gate valve, or vice versa.

Q. 183. And in Complainant's Exhibit V how would you set the parts to this end?

A. Set the parts by the adjusting screws which would limit the rapidity with which the oil would be transferred from one side of the piston to the other—adjust them so as to retard the flow.

Q. 184. I now show you Complainant's Exhibit W and ask you if you know what it is?

A. It appears to be a part of a mechanism which I have seen and examined on a water wheel governor commonly known, I believe, as the Lombard governor, although it may be used upon governors not bearing that name.

Q. 185. Are you familiar with the operation of this device?

A. I believe that I am; yes sir.

Q. 186. I now show you Complainant's Exhibit Z and ZZ, and I will ask you if you can state briefly what each of the same shows?

A. Referring to Complainant's Exhibit Z, there is there represented a type of water wheel governor whereby the variation of speed causes a change in the position of the balls of the fly-ball governor, and the fly-balls being indicated as G-E. Connected with the stem of the fly-ball part of the governor is a rod, as I see it, marked Y-G, the vertical motion of which will control a piston within a cylinder and admit oil, water, or other suitable liquid to either side of the piston of a cylinder containing

a piston equipped with a piston rod which through suitable gear will rotate a shaft D-E. Connected with a rod Y-G is an elongated spur gear UU-J which meshes with a rack also marked UU-J. This rack is rigidly connected to the outside casing of the dashpot marked "Returning dashpot" which is equipped with adjusting screws whereby the freedom with which the oil may be transmitted in said dashpot from one side to the other of the piston within the dashpot, can be regulated. The piston of the dashpot is connected to a piston rod or stem L-E capable of receiving motion from the extended stem of the main piston within the cylinder W-G, which transmits a rotary motion to the shaft D-E. Supplementary to the returning dashpot and connected with the rack UU-J there is a spring not lettered, but the whole Exhibit V is a blue print showing component parts of a water wheel governor equipped with a controlling device, the action of the controller being affected by variation of speed, the controlling device operating to set in motion a shaft and through this shaft the operation of the water to the water gate, and in connection with a mechanism similar to Complainant's Exhibits V and U controlling the operation of the water wheel by the use of a water gate and a by-pass valve inversely operated.

ZZ is a representation of a similar type of governor, the essential difference being the arrangement of the returning dashpot which in Exhibit ZZ is automatically controlled by the use of a clutch bar which is in the shape of a pin operating within a slot ZZ in such a manner that a rapid motion transmitted from the piston stem or piston rod L-E will cause the regulation of the oil within the

dashpot to be varied, or will tend to make the oil move more freely from one side to the other of the piston. In other essentials Exhibit ZZ is substantially the same as Exhibit Z.

Q. 187. Now, when this more rapid movement or flow of oil in the dashpot in Exhibit ZZ is permitted, what would be the effect upon the movements of the rack and pinion UU-J?

A. The effect will be upon the rack UU-J that since the oil will be allowed to move more freely from one side of the piston in the dashpot to the other, the rack UU-J will be retarded to a greater degree.

Q. 188. What is the action of the spring you have referred to in this blue print with respect to the rack and pinion UU-J?

A. The act of the spring is such as to allow the rack and the pinion which is meshed therewith to move relatively to the fixed parts for a certain distance, which it could not do if it were not for the introduction of the spring.

Q. 189. What is it that causes the movement of the rack and pinion after the spring has been put under tension?

A. There would be motion transmitted through the piston in the dashpot.

Q. 190. No. I am referring to the movement after that motion, namely, after the spring has been put under tension. What is it that then causes the movement of the rack and pinion?

A. After it has been entirely extended?

Q. 191. Yes. After it has been extended as com-

pletely as the movement of the dashpot determines. In other words, what causes the movement of the rack and pinion after the first phase of movement of the dashpot in the governing action is completed? To further amplify I will say, after the dashpot has been moved through the governing mechanism to put the spring under tension, what causes the succeeding movement of the rack and pinion?

A. I don't know whether I can answer that question.

Q. 192. Well, let us get at it this way: After the governing action has pulled upon the dashpot and rack and turned the pinion in one direction, putting the spring under tension, what is the succeeding action of the spring?

Mr. Westall: Objected to as assuming that a certain action takes place that has not been testified to.

A. After the spring is entirely extended then the motion will be transmitted as if it were rigidly connected without any spring.

Q. 193. By Mr. Blakeslee: Does the spring afterwards become contracted?

A. Ultimately, yes sir.

Q. 194. And what causes its contraction?

A. The movement of the piston within the dashpot.

Q. 195. Anything else?

A. The motion of the rack itself during the period of contraction.

Q. 196. And what, if anything, occurs with respect to the pinion?

A. It rotates the pinion and that moves vertically, the vertical stem passing through the pinion.

Q. 197. And how is that caused?

A. That is caused by the rotation of that stem and the fact that it is spread at the bottom.

Q. 198. And that acts how upon the valve of the controlling mechanism?

A. It moves the valve vertically and, in fact, the controller valve of the controller thereby moves by the contraction of the spring.

Q. 199. And what effect upon the action of the controller is caused by this movement of the controller valve?

A. The position of the piston of the controller is shifted so as to affect the operation of the main gate and by-pass control.

Q. 200. In what direction relative to the first movement of the gate and by-pass valve?

A. In the opposite direction.

Q. 201. Now, when this motion of the rack and pinion under the influence of the spring takes place, does anything else move with the rack?

A. The dashpot itself.

Q. 202. And what effect upon its movement is caused by the movement of the clutch bar caused by the inclined faces of what you have called the slot ZZ?

A. The clutch bar is raised by the relative motion, and after having been raised it will allow the oil to circulate more freely from one side of the piston to the other, and if this clutch bar returns to its lowest position in the slot, then the dashpot itself will tend to move more nearly with the piston itself, and would tend to

be more rigidly connected with it, since the circulation of oil has been restricted.

Q. 203. Now, while the clutch bar is raised and a freer circulation is made in the dashpot, how about the movement of the dashpot with relation to the piston in it?

A. The dashpot can move more freely as compared with the motion of the piston than it could with the clutch bar down to its lowest position.

Q. 204. Then this variable movement of the dashpot and of the rack connected with it and of the pinion in returning under the action of the spring, causes what result with respect to the governor action after the first governing action has taken place?

A. It increases the time element of the governor action.

Q. 205. What is the purpose of this action?

A. It is to prevent the sudden closing of the by-pass after governing action has ceased. Because if the by-pass were suddenly closed it would tend to change the velocity suddenly in the pipe line, introducing serious stresses therein.

Q. 206. What I wish to determine is this: This variation of the speed of movement of the rack and pinion, causing resultantly a variation of the movement of the controller valve or piston, has what effect upon the rate of governing action?

A. It reduces the rate of governing action.

Mr. Westall: Counsel for the defendant understands that it is the plan of the complainant to have Mr. Cory testify tomorrow. Counsel for the defendant does not

waive the right to cross-examine nor his right to such cross-examination at its usual place at the close of the witness' testimony, and he wishes to now give notice to counsel for complainant that unless an opportunity is accorded to him to cross-examine both the witness Henry and the witness Cory before the expiration of the time allowed by stipulation and the order of the court, he will move to strike out the testimony of either or both of those witnesses.

Mr. Blakeslee: To clear up once and for all this matter of Mr. Henry's cross-examination and further direct examination, we call attention to the arrangement shown by the record on page 122, namely, that it was understood and agreed that the cross-examination of Mr. Henry might be made in San Francisco during the latter part of "next week", being the present week, and that he will appear for that purpose, or at such time and place "as may be hereafter agreed upon", and that complainant counsel also reserved the right to recall Mr. Henry for further examination, subject to the usual further cross-examination as to any such testimony, at any time prior to the completion of complainant's prima facie case. Now, we will stand upon that agreement as to Mr. Henry's further examination and his cross-examination, and as to any other witness, defendant's counsel may cross-examine such other witnesses immediately upon the conclusion of their direct examinations.

sent
January 23, 1914. P. M.

292 27½ “The present witness, Mr. Cory, is excused to report for further direct examination and for cross-examination upon the conclusion of his direct examination, he to so reappear at this place on Saturday, January 24, 1914, at the hour of 2 o’clock P. M.”

GEO. J. HENRY, JR., DIRECT EXAMINATION
RESUMED

By Mr. Blakeslee:

Q. 141. Prior to the commencement of the present suit did you take any action in the direction of notifying the defendant, the City of Los Angeles, of infringement of the Lyndon patent in suit?

A. I did, by requesting my attorney to notify the city and extend them every opportunity to take cognizance of their infringement.

Q. 142. Can you produce any showing of any such notice to the city of Los Angeles, the defendant?

A. I have here before me a copy of a letter dated August 8, 1913, which, upon reading, I find to be substantially the same as a copy mailed me by my attorney on or about August 8, 1913, and which I understand was mailed to the mayor and council of the city of Los Angeles, City Hall, South Broadway, Los Angeles, California, on August 8, 1913, by Mr. Blakeslee, my attorney in this case, and which appears to be an exact copy of a letter which he forwarded to me on the same date, and the statement that he had mailed such a registered letter. And I find attached to said copy which I now hold a registry return receipt endorsed "Return to Raymond Ives Blakeslee, 728 California Building, Los Angeles," and on the back of said receipt the words "Received from Postmaster registered article original number of which appears on reverse side of this card. Date of delivery 8/9/1913, H. H. Rose, Mayor, G. M. Gallagher," and the receipt for registered mail stamped "Registered Los Angeles, California, August 8 1913," and bearing the number 65202, which number corresponds with the

original registration receipt number signed by H. H. Rose, Mayor, and bearing the post-office stamp Los Angeles, August 9, 4 P. M., 1913.

Mr. Blakeslee: The complainant offers in evidence the copy of the letter just testified to by the witness with the attached registered mail receipt and return receipt, both attached thereto, as Complainant's Exhibit EE.

Mr. Westall: Counsel for the defendant objects to the purported copy of the notice on the ground that it is no sufficient notice to the city of Los Angeles of the matters and things of which it purports to be notice.

(The said copy of letter so offered in evidence together with the attached receipts is marked by the Examiner as Complainant's Exhibit EE.)

Q. 143. By Mr. Blakeslee: Can you produce any further written evidence pertaining to the subject of the notice to the city of Los Angeles, Defendant, pertaining to the patent in suit?

A. I can, and I hand you herewith a letter signed by the secretary and appearing on a letter head of the office of Public Works, city of Los Angeles, Room 18, City Hall, dated September 4, 1913, and addressed to Raymond Ives Blakeslee, my attorney in this matter, and endorsed, "Received 9/5/13."

Q. 144. From whom did you obtain this letter?

A. This letter was handed me by my attorney with the statement that it had been received in the regular course of United States mail from the Board of Public Works.

Mr. Blakeslee: We offer the letter just produced by the witness in evidence as Complainant's Exhibit FF.

Mr. Westall: Counsel for the defendant objects to the admission in evidence of the document referred to on the ground that it is incompetent, irrelevant and immaterial and is not a sufficient acknowledgement of notice to the city of Los Angeles.

Q. 145. By Mr. Blakeslee: Referring now to the agreement of July 7, 1913, between yourself and one Lamar Lyndon which was marked for identification by the Special Examiner on January 15, 1914, and which has been copied into the record in connection with your previous testimony, describe briefly the transaction involving the execution of this agreement and the delivery to you of this instrument so marked for identification.

A. That instrument is a document signed by Mr. Lyndon and by me through my attorneys in the East who were acting for me in this matter, to consummate the sale to me of the patent in suit, being United States Letters Patent 695220 issued to Lamar Lyndon, and for the purchase of which I had been negotiating with Mr. Lyndon for some time by correspondence.

Q. 146. Have you ever met Mr. Lyndon?

A. I never have met Mr. Lyndon personally.

Q. 147. Are you familiar with Mr. Lyndon's signature as per correspondence had with him?

A. I am.

Q. 148. Does that signature upon such instrument agree with the signature as you are familiar with it?

A. It does.

Q. 149. And in what manner was the recordation of this agreement secured?

A. This instrument which also bears the attestation

of a notary public of New York County, State of New York, was forwarded by me to the United States Patent Office shortly before the 17th day of September, 1913, and recorded by the United States Patent Office on that date, as indicated by the seal of the Patent Office of the United States of America attached thereto. This recordation was done at my request.

Q. 150. And from whom did you receive the recorded document?

Mr. Westall: . Objected to as incompetent, irrelevant and immaterial.

A. And the recorded agreement was thereafter returned to me by the Patent Office, bearing said certificate of recordation.

Mr. Blakeslee: We assume that these matters speak for themselves, but as counsel seems to feel dissatisfied with anything but full proof as to the execution and recordation of this agreement, we somewhat amplify this record, perhaps unnecessarily, and for those reasons.

Mr. Westall: Counsel for the defendant denies that he has suggested anything in regard to full and exact proof, and he considers the statement just made by counsel for the complainant as entirely superfluous, the recording speaking for itself, and also suggests that any assumption made by counsel is absolutely of no relevancy or pertinency to any of the matters in this case.

Mr. Blakeslee: Complainant offers in evidence the recorded agreement between Lyndon and the Complainant with the acknowledgements and certificates of recordation in the Patent Office, as Complainant's Exhibit GG, Lyndon and Henry agreement.

Mr. Westall: Counsel for the defendant objects to the admission in evidence of the document referred to on the ground that there has been no sufficient foundation laid.

(The said document so offered in evidence is marked by the Examiner as Complainant's Exhibit GG, Lyndon and Henry agreement.)

Mr. Blakeslee: Complainant also offers in evidence original United States Letters Patent to Lamar Lyndon No. 695220, marked for identification by the Special Examiner January 15, 1914, as Complainant's Exhibit HH, Lyndon patent in suit.

(The said patent so offered in evidence is marked by the Examiner as Complainant's Exhibit HH, Lyndon patent in suit.)

G. 151. By Mr. Blakeslee: Referring now to Complainant's Exhibit V, I will ask you to please describe generally the construction of the parts marked in ink UUU, WW, "Adjusting screws," and "By-pass valve stem," "By-pass valve," and "Oil dashpot OO" and the other parts marked in pencil 2, 3, 4, 5, 6 and 7, and also the inter-relation and operation of these parts, and I will ask you after you have answered the question to put into ink the said reference numerals with leading lines extending therefrom, to make a more permanent record, leaving the pencil numbers and leading lines still on the drawing.

Mr. Westall: Objected to as having been already fully covered in the previous testimony.

A. Stem UUU is connected by pivots RR and cross-head SS to one end of the double lever NN, mounted on

the shaft LL, actuated from the remaining governor mechanism through the lever KK and connecting rod II, thus causing lateral movement from the remaining governor mechanism of the rod UUU. This rod has mounted upon its end and within the oil dashpot a piston head, the dashpot being filled with oil and having an adjustable by-pass from one side to the other of said piston head. The adjustable by-pass being adjusted so as to vary the rate of flow of the oil from one end of the dashpot to the other by adjusting-screws. The dashpot is connected at point 6 with the by-pass valve stem 7, and this by-pass valve, said dashpot also carrying lug 4 against which bears the spring WW. These two springs act together in tandem, there being a loose washer between them. They are wound in opposite directions, so as to reduce lateral distortion of the spring to a minimum. Springs WW bear on the opposite end against the nut 5 carried upon the rod 2, which rod is held from lateral movement by pivots or connecting holt 3. It will thus be seen that when the oil dashpot is moved by the rod U acting against the piston head and the body of oil contained around the piston in said dashpot, it will move in a direction corresponding with the movement of UUU, and on an opening of the by-pass valve through the valve stem and oil dashpot there will be compression produced in the springs WW which will now tend to restore the by-pass to normal position, by tending to force the dashpot through its connections 6 and 7 and by-pass valve stem in a contrary direction to the movement of UUU. It will be restrained in this contrary movement by the flow of oil around the piston head through the adjustable by-pass in said dashpot, and the rate at which it will return

in a direction contrary to the movement of UUU will thus be limited by said adjusting screws. Upon its return to normal position no further oil will pass from one side of the the piston head to the other, and, consequently, no further movement of the by-pass valve will take place. I have marked the figures you have requested in ink, and lead lines as dotted ink lines.

Q. 152. Please now compare the parts just discussed with the corresponding dashpot connection features shown in Complainant's Exhibit U, pointing out, if there be such, any differences or distinctions.

Mr. Westall: Objected to as having been fully covered by the witness in his previous testimony.

A. I might say that there are no differences with the exception of the by-pass valve in Exhibit UU, as shown on the left hand side of the drawing and the connecting rod U on the right, whereas in Exhibit V the by-pass valve is shown on the right and the connecting rod UUU on the left.

Q. 153. I call your attention to Exhibit HH, being the Lyndon patent in suit, and I will ask you to please state briefly, as an addition to your previous testimony, concerning the same subject matter, the sequence of energization of the magnets 15 or 16, the magnets 32, and the magnets 64, and the sequence of resultant operations of the parts controlled thereby, and after that the sequence of such de-energizations and resultant actions on the parts controlled thereby; and in answering such question, I will ask you to state the sequences with respect both to slight variation of load upon the water wheel and more extreme variation of such load.

Mr. Westall: Objected to as having been fully covered by the witness in his previous testimony and as simply apt to fill up the record with matters which have already been thoroughly gone over.

A. I have previously testified in regard to the operation of the governing device of the Lyndon patent in suit as regards their general mode of operation. The specific operation of the several parts as regard their sequence and the relevancy of this sequence to obtaining the most successful results in commercial operation, is another matter which I have but briefly touched upon. The schematic drawing, Figure 1, of the Lyndon patent, which discloses the several devices and their manner of connection, when taken into consideration with Fig. 2, Fig. 3, Fig. 4, 5, 6 and 7, ~~which~~ disclose a governor readily adaptable to meet the varying conditions of head, power, length of pipe line and character of load, that are met with in practice. In the case of a slight changing load, where the consecutive changes are but very slight and at intervals sufficient to enable the speed to be restored to normal after each such change, as, for example, a plant supplying several thousand incandescent lights and comparatively small motor service,—would require that a governor to properly control the speed should make but slight movements of the gate upon one or several lights being turned off at a time. In such a case as this, the slight gate movement would not produce a sufficient inertia effect in the pipe lines to make necessary the introduction of returning devices or the by-passing of the water toward gate closure, and, therefore, in such a case, contacts 45, 46, 103 and 104 would not be made with contacts 45A, 46A, 100 and 101. If, however,

a complete circuit of lights were thrown off or on as, for example, when a series of arc lights in a city street was turned on in the evening and was then turned off at 2 o'clock, such a load change would call for a greater degree of shifting of the water gate influencing the flow of water to the water wheel, and in such a case as this if said load was a considerable percentage of the total load being carried by the plant, a more violent fluctuation in the water velocity would be occasioned in the pipe line supplying said water wheel unless a by-pass valve were opened during said gate closure. This effect would be very important if the pipe line were long, making still more necessary the greater degree of opening of the by-pass and to make said opening to approach more nearly to the rate of closure of the main gate. In such a case voltage variations in the dynamo 8 in the Lyndon patent Fig. 1, would be occasioned by the greater load variation, and, therefore, the speed variation of the water wheel. Said increased voltage which would cause plunger 34 to be moved to a further degree by solenoid 33, causing the lever 43 to be moved through a sufficiently greater distance to engage contacts 100 and 101 with contacts 103 and 104, causing a movement of the by-pass valve in the opposite direction to the movement being produced by the water gate, said movement of the water gate being produced in each instance of governor movement by the rotation of gears 9 and 10 through the clutch engagement of magnets 16 or 15. The by-pass will, therefore, be placed into operation in such case of more increased load. Especially would that be the case where the pipe line is a long one. In the case of a short pipe line, other things being equal, this condition of inertia would not be so

important, and in such a case it would not be necessary to shift the by-pass valve to the same degree, and contacts 45A and 46A might under such an assumed state set of conditions be caused to engage before the aforesaid contacts of the by-pass valve. We would in this case have the operation of the returning device before the operation of the by-pass valve. These relative movements of the returning device and by-pass, one anticipating or following the other, are matters of adjustment of the contacts under the general control of lever 43, such adjustments to be made as required to meet conditions in any given instance. In any case of an assumed adjusted condition of the governor to meet the aforesaid existing conditions on a given plant of pipe line length head, horse power capacity, character of load and amount of load, the diameter of pipe line, the sequence of operations that would be performed by the governor as disclosed in the Lyndon patent and drawings, would be, first, the engagement of the operating clutch through gears 9 or 10 to produce movement in the shaft 20 on the energization of magnets 16 or 15; second, the engagement, in the first assumed case, of contacts 100, 101, 103 and 104, energizing magnets 64 and producing a movement of the by-pass; third, in the same first assumed case, the making of contacts 45, 46 45A and 46A, causing the energization of magnets 32 and the operation of the returning device. The operations of the several devices, first, second and third herein mentioned, would continue for a sufficient period during which the movement of the main gates would be made to the required degree and the by-pass would be opened to the required degree and the returning mechanism would be operated to the required

degree to bring about a restoration of speed. A cycle of speed-energization will then commence and proceed in the following order: the speed of the water wheel shaft is now approaching normal. Contacts 45 and 46, 45A and 46A, have been undergoing a making and breaking action. They now are broken, and, the speed still approaching closer to normal, we have as the next step the breaking of contacts 100 and 101, 103 and 104, and the consequent de-energization of the by-pass magnet 64. The speed is still approaching more closely to normal and we now have as a final step in the governing the interrupting of contacts 40 and 40A, or 41 and 41A, as the case may be, and a complete restoration to original normal or inoperative position of plunger 34 in solenoid 33 and an interruption of governor movement.

In the second assumed case, that is, where, for example, the pipe line is shorter, and the movement of the by-pass need not be as great in proportion as in the first assumed case, and in which second assumed case the returning mechanism is set into operation at an earlier moment than is the by-pass and for less changes of load than is the by-pass, the cycle of operations that cause energizations of the magnets is as follows: on any speed change the making of contacts 40 and 40A, and 41 and 41A, the energization of the proper connected magnet for the operation of the gate shaft as previously described. Upon a greater load change contacts 45 and 45A, and 46 and 46A, would be made, introducing movement in the returning mechanism. The third step would be upon a greater load change, the making of the further contacts 100 and 101, 103 and 104, and the energization of the by-pass magnets 64 operating the by-pass in an inverse direction to the

water gate, and the governor, acting for a sufficient period of time to compensate for the variation from normal in speed and pressure, would then act automatically to bring about de-energization of the several magnets as follows: first, contacts would first be finally broken at 100, 101 and 103 and 104. Second, upon the speed still further approaching to normal, the contacts would be broken at 45 and 46, 45A and 46A, thus de-energizing returning magnet 32 and allowing the balance of the returning movement to proceed through the mechanical devices. Third, upon the gate having been shifted a sufficient degree and the returning devices having acted to complete the returning movement before the governor has "overrun," contacts 40 and 40A, or 41 and 41A, as the case may be, will be finally broken, thus arresting further movement.

Attention is directed to the fact that in the above two assumed cases, first, one in which the inertia effects in the pipe line are more serious, the by-pass is called into action at an earlier period of the governing movement and its movement proceeds to a further degree; in the second case where the returning magnets 32 are energized before the returning magnet 64, we will get a step-by-step movement of the by-pass magnet and by-pass through the associated connections, such that the total movement of the by-pass is less than in the previous case.

Q. 154. Now, please state the relation to the sequences of energization and de-energization of the electro magnets just set forth, or to any of the same, of the breaking of the circuits at 40A and 41A, causing de-energizations respectively of the magnets 15 and 16 and

termination of the governing action due to and by means of the circuit breaker, including the contacts 84, 85, 86 and 87, controlled by the rotation of shaft 20; also the relation to such sequences of the breaking of the circuit through the electro magnets 64, due to the elevation of the arm 74 in the rotation of the sheave 54, upon the shaft 20.

Mr. Westall: Counsel for the defendant objects to the question as having been fully covered in the previous examination.

A. The operation of the devices that you have just directed my attention to are for the purpose of preventing an over-traveling of the main gates and by-pass due to the rotation of shaft 20. In water wheel apparatus there is naturally a limit to which the gate can be opened or closed, and any great mechanical stress placed upon the gate or by-pass to move these members beyond the limits of their movement or stroke would result in a breakage of the parts. To prevent such breakage and arrest the governing movement at the proper moment, Mr. Lyndon has introduced circuit-opening devices in the circuits of the several magnets as stated in your question. The sequence in which these operate is that upon the water gate arriving at the end of its stroke the circuit of the magnet 15 or 16, depending on which one has been acting upon the clutch 13 to engage movement of the shafts 12 and 20, is interrupted. For example, the circuit of magnet 15 is interrupted by the movement of finger or lever 84 away from its contact point, thus breaking the circuit and de-energizing magnet 15 and preventing further movement by the disengagement of clutch 13. The magnet 16, having been producing gov-

erning movement, upon the limit of said movement being reached, finger 85 is shifted to break the circuit of said magnet 16, thus de-energizing it and preventing further movement in the same direction. Upon sheave 54 causing the by-pass to reach the end of its movement, finger or arm 74 and contact 75 are separated so as to cause the de-energization of magnet 64 and thus prevent further movement of the by-pass-operating device.

Q. 155. By Mr. Blakeslee: I now show you Complainant's Exhibit AA, BB, CC and DD (blue prints), and ask you if you have seen the same before?

A. I have.

Q. 156. Do you know who produced the same?

A. Yes, sir. These were produced under my direction in my draughting room for the purpose of more clearly illustrating the sequence of operations in the Lyndon patent in suit. I have had these drawings prepared from the Lyndon specifications, particularly from drawings Fig. 6 and 7 of the Lyndon patent, and the parts of these several blue prints bear the same identification numbers and marks as Figures 1 and 6 and 7 of said Lyndon patent.

Q. 157. I call your attention to the Lyndon patent, Fig. 1, and to the difference in the diameter between the pen-stock, or water-supply pipe 1, and the by-pass pipe 47, and I will ask you if you have anything to say with respect to these differences in diameters and the relation of such difference to the operation of the invention.

A. As I testified a few moments ago, the amount of water to be by-passed upon a gate change being effected by the governor, is dependent to a considerable degree upon the conditions surrounding the designed installa-

tion and operation of individual plants. In some plants it is necessary to by-pass a greater quantity of water than in others. That is, to maintain during the period of governor movement a rate of flow of water in the main pipe more nearly constant than in others. There are some cases where the by-pass will not have to be made to as great degree as might be indicated by the proportions in the Lyndon drawing, and there are other cases where the size of the by-pass for the proportional amount of water discharged would have to be in a greater proportion than that indicated in the Lyndon drawing. Mr. Lyndon has indicated in his specifications that the amount of water to be by-passed is a question of degree and that the by-pass should be proportioned accordingly.

Referring now to line 72 of the second page of the Lyndon patent in suit and reading therefrom, I find: "This by-pass is of an area which is a small percentage of the area of the feed gate," indicating that in the ordinary conditions of plant operation it is not necessary to have the by-pass as large or to be provided to pass the same quantity of water as will fill the main gates.

Q. 158. Are you acquainted with Mr. C. L. Cory, the witness who has testified in your behalf in this case?

A. I am.

Q. 159. How long have you known Mr. Cory?

A. Over twenty years.

Q. 160. What can you say of your own knowledge of the general reputation in the mechanical world and among mechanical and electrical engineers and teachers of mechanics, as to his ability, experience, knowledge and adjustment and training as a mechanical and electri-

cal engineer and teacher in the allied subjects, and consulting engineer in these allied subjects?

Mr. Westall: Objected to as incompetent, irrelevant and immaterial.

A. He has a very excellent reputation and long experience in the theoretical field and a great experience in the practical field that you have mentioned.

Q. 161. By Mr. Blakeslee: How is he rated as a teacher of these subjects?

A. As among the very best, and holding a position of great importance and responsibility in the University of California.

Q. 162. In completing your testimony as far as I am now advised, I will ask you to produce, if you can, at a session to be held at this place tomorrow, a drawing or blue print ⁴ drawing showing in diagramtic and partly structural representation the main essential parts and devices and groups of parts of the water wheel governor disclosed by the Lyndon patent in suit, as previously testified by you, and also a similar showing of the main and essential parts and features and groups of parts and elements of the governor, being the installation testified by you in the Cottonwood Power Plant, or Division Creek No. 2 power plant, or both, as you may elect, the related parts and elements and groups of elements in the structures being arranged in juxtaposition. In this connection I give notice to counsel for the defendant that I shall recall the present witness to introduce this drawing or blue print thereof and describe and identify the same, and that he shall have opportunity immediately to so cross-examine the witness as he may wish as to these subjects. As far as I

am informed, there will be no other direct examination of the present witness, and he may now proceed to cross-examine him.

CROSS-EXAMINATION.

By Mr. Westall:

Q. 163. Mr. Henry, is the consideration expressed in this purported assignment as paid by you to Mr. Lyndon for the assignment the true consideration that passed between you?

A. Yes, sir, as modified subsequently by cash in lieu of notes. I paid cash in place of the notes that are therein specified.

Q. 164. What was the total amount of the consideration paid by you for this patent?

A. The true and total consideration that was paid by me for this patent to Mr. Lyndon was \$2500, as follows: first, a payment of \$50; secondly, a payment of \$1500; and, third, a payment of \$950. The final payment of \$950 was in lieu of the two notes specified in the assignment.

Q. 165. When did you make the last payment?

A. I issued the last payment to Mr. Lyndon on July 28, 1913.

Q. 166. Has Mr. Lyndon any interest in the patent now?

A. None whatever.

Q. 167. If an accounting is decreed against the defendant in this case will Mr. Lyndon be entitled under any agreement between you and him to share in any amount which might be found due?

A. Absolutely none.

Q. 168. What is Mr. Lyndon's address now?

A. New York City, somewhere on Broadway. I can get that for you if it is a matter of importance.

Q. 169. I would like to have you give the number, if you can.

A. If I were addressing Mr. Lyndon today, I would address him at No. 60 Broadway, New York City.

Q. 170. What is Mr. Lyndon's business?

A. I understand Mr. Lyndon to be a consulting engineer.

Q. 171. How did you and Mr. Lyndon arrive at the price of \$2500 for the patent?

Mr. Blakeslee: Objected to as irrelevant, immaterial and incompetent, the amount of consideration, consideration being shown, being immaterial in any respect.

A. I inquired of Mr. Lyndon what he would take for his patent and he set the price and I paid the price.

Q. 172. By Mr. Westall: Is there any outstanding license or anything else taken into consideration in fixing the price?

A. Mr. Lyndon says not.

Q. 173. How long did you know Mr. Lyndon?

A. I have only known Mr. Lyndon by correspondence and known of him for five or six years.

Q. 174. When did you first begin negotiations for the purchase of the patent in suit?

A. I think I first wrote to Mr. Lyndon about eighteen months ago on the subject of purchasing his patent.

Q. 175. Have you instituted any other suits charging infringement of this patent?

A. I have not.

Q. 176. You testified regarding what has been known as the Lombard governor and you identified certain alleged infringing mechanism as being a Lombard governor. In your experience as an engineer do you consider a Lombard governor a good efficient form of governor device?

A. A very efficient form of governing device.

Q. 177. Do you consider it a good form for such places as the Division Creek No. 2 and Cottonwood plants?

Mr. Blakeslee: Objected to as indefinite. It is not understood what the place has to do with the governor, as the place itself which is assumed would not vary its operation aside from its combination at such places with something else.

A. The several types of Lombard governors sold by the Lombard Governor Company are adaptable to varying conditions, the principal variation being the amount of power which the different sizes will develop, and, therefore, the size and capacity of the water wheel that will be used and controlled. All the Lombard devices are well equipped with adjustable features to permit of their adjustment to adapt them to variations in local conditions within the capacity of the specific governors. I consider that the Lombard governor in the Division Creek plant and in the Cottonwood plant previously testified to are excellent devices, as far as they are utilized in combination with the nozzle apparatus, to produce the requisite governing.

Q. 178. By Mr. Westall: How long has that particular form of governor been in general use?

A. The form of Lombard governor, I believe, first

came to my attention in about 1901-2. By the "form of governor" I do not mean the exact type as used in these plants, as the form of Lombard governor used at the Division Creek plant came into use at an earlier date. But, as contained at the Division Creek plant, it has added devices which were not put into use, within my knowledge, until about the year 1902. The form of governor at the Cottonwood plant, I believe, is a design of governor of much more recent date. I doubt if either of the governors in the Division Creek No. 2 plant were designed and constructed previous to the year 1905.

Q. 179. Of the 200 water wheel governors you have testified were designed and installed by you, how many were governors of the same general type as the Lombard governor described by you as being in use at the Division Creek No. 2 and Cottonwood plants?

A. As containing the same elements of governors as Division Creek No. 2 and Cottonwood plants, I might say that most of them have contained the same elements as the Lombard governor in question.

Q. 180. Were those governors used in connection with a Doble nozzle device in any way similar to the ones you have shown in Exhibits U and V—the line drawings?

A. Not the same structural device as shown in those drawings, but a good many of them were in combination with the same elements.

Q. 181. By "the same elements," what do you mean?

A. I mean relief valves or by-pass valves actuated by the governor inversely to the movement of the water gates.

Q. 182. So that they had, you might say, the same general principle of operation as those exhibits described?

A. In many cases; yes, sir.

Q. 183. When did you ever put in a Lombard governor in connection with any such Doble nozzle device involving the same general principles?

Mr. Blakeslee: Objected to as indefinite, especially with respect to the term "Doble nozzle."

A. I should say from about four to five years ago I was first closely associated with the design and construction of water-power wheels in combination with by-pass valves actuated inversely to the water gate, such action of both the water gate and by-pass being effected through the governor. I cannot say positively that my first experience was with the governor known as the Lombard. It might have been with the Pelton types of governors. But, in any event, the devices I referred to involved the elements or principles.

Q. 184. By Mr. Westall: So that if I understand you correctly, the devices that you put in, that you have described as embodying the same general elements and type of construction, would, under your view of this construction of the Lyndon patent in suit, constitute infringements of that patent? Is that not true?

A. I believe they would. If I may be permitted to add to that answer, I may say that one of the reasons actuating me in purchasing the Lyndon patent was to protect parties who might purchase apparatus from me involving these elements, as I believed after investigation that the Lyndon patent was a valid patent and the

purchasers of apparatus from me were entitled to that protection.

Q. 185. Now, had any of the installations with which you had anything to do involved governing mechanisms substantially like the means disclosed and described in the Lyndon patent in suit?

A. I think I have already answered that question.

Q. 186. In a broad and general way you have. Perhaps I should make it more specific. Have you ever installed in the course of your engineering experience a governing device which corresponded in all details of construction to that disclosed and shown in the Lyndon patent in suit?

A. No, sir.

Q. 187. Did you ever know of anyone installing a governing device built in exact accordance with the specifications and drawings of the Lyndon patent in suit?

A. No, sir.

Q. 188. Did you ever know of the installation of a governing device employing a dynamo as shown in this patent in connection with magnets like those shown in 15 and 16, and the solenoid like that shown at 33, and also a magnet like that shown at 32 and at 64, with their connections?

A. As far as your question goes, I might say that I have seen governing devices containing the elements as you have described them. But such governing devices were not in use on water wheel apparatus. The method of using voltage variations as shown in dynamo 8 and solenoid 33 and plunger 34, actuating magnets, is, I believe, in use in various forms of electrical controlling

apparatus. And, without being able to say exactly where or when, or driving what, I have seen such apparatus. I know that I have frequently seen it.

Q. 189. But you have never seen it actually in use in the governing of the speed of a water wheel?

Mr. Blakeslee: Objected to as indefinite and as doubtful what the question means by "it."

A. No, sir; I have not.

Q. 190. By Mr. Westall: So that your explanations and exposition of the working and operation of the different parts of the patent in suit, is based rather upon theory than upon the practical experience with a device built exactly or substantially in exact accordance with that of the patent in suit?

A. Not at all. To make this matter clear, I will say that I have wound and built and operated a great many electrical devices and am thoroughly familiar with the adjustment of contacts and the making of contacts and with the several electrical elements that enter into the Lyndon apparatus. I have used magnets for producing the same movements as indicated in the Lyndon patent, drawings and specifications a sufficient number of times to be absolutely certain as regards the movements that will follow if constructed in accordance with the Lyndon drawings and specifications. And my exposition and explanation of the operations that will take place in the Lyndon patent are such as one skilled in the art who studies the Lyndon patent cannot help but arrive at in reading Mr. Lyndon's explanation and drawing.

Q. 191. That is to say, if I understand you, that your explanation taken in connection with Mr. Lyndon's explanation, will make the device clear enough for one

skilled in the art to apply the disclosures of the Lyndon patent. Is that correct?

A. My explanation taken in connection with Mr. Lyndon's disclosure, yes, sir.

Q. 192. While you are familiar with the operation of magnets and electrical connections generally, as you have described, you do not mean to say that you have ever seen a series of magnets and contacts connected up as shown in this Lyndon patent?

A. I can't say whether I ever have or have not seen a set connected up exactly as shown in the Lyndon patent, but I have seen so many magnets and solenoids operate in conjunction with contacts, that the manner in which such magnets and contacts and solenoids and dynamos would work in the Lyndon patent is easy to understand.

Q. 193. Then, if I understand you correctly, there was nothing new with Lyndon in using magnets and solenoids and a dynamo wound as described, to move certain levers?

A. I didn't say that. I said that I was perfectly familiar with it. I cannot say that I was familiar at the time of Mr. Lyndon's application or the issuance of his patent, with such devices to the same degree that I am now.

Q. 194. Were such devices in common use for other purposes at the time of the date of the Lyndon patent?

A. I know that solenoids and magnets and contacts were frequently used before such date.

Q. 195. For purposes analagous to that for which Mr. Lyndon had used them?

A. Solenoids for producing contacts; magnets responsive to energization when such contacts were made; yes, sir.

Q. 196. Then it is true that there was nothing broadly new in the adoption by Lyndon of these electrical devices to produce the results which he has produced?

A. It is true that there were mechanical equivalents of these devices and probably electrical equivalents of these several same devices at the time of Mr. Lyndon's patent.

Q. 197. Then there was really nothing broadly new in the adoption of those means to actuate levers and to make contacts? Is that true?

A. In the adoption of the magnet to produce motion as distinguished from other mechanical methods producing motion, there was nothing new. In the adoption of the solenoid to produce movement on a voltage variation there was nothing new. I believe Mr. Lyndon was new in the art in producing a voltage variation at a greater rate than the speed variation at that time for the purposes of control of the governor, and as such he accomplished a more sensitive movement of the governing means.

Q. 198. Now, in regard to the devices which you have testified that you designed or installed, what proportion of those devices employed a main nozzle equipped with a needle valve, and an auxiliary nozzle with a needle valve, said auxiliary nozzle operating as a by-pass in substantial accordance with the operation that you have described in describing line drawings U and V?

A. I believe the first devices that I have designed having a needle and by-pass nozzle actuated inversely to said needle or water gate through the agency of the governor, were two in number. There might have been four of these, but my present recollection is that there were but two, and they are the only ones that have ever been built, that I can think of at the moment, from my designs.

Q. 199. As chief engineer of the Pelton Water-Wheel Company, you had charge of installation or took a part in the work of superintending installation of how many governing devices equipped with nozzles where the valves operated inversely to each other as you have described?

A. Probably 25 or possibly 50. I take it that you mean by "installation" the design and construction?

Q. 200. Yes, sir.

A. Because "installation" means the putting in of stuff already built. I didn't do much of that.

Q. 201. What were your duties as chief engineer of the Pelton Water-Wheel Company?

A. Designing and superintending the construction of the apparatus, making up the price-list of apparatus very often.

Q. 202. Were you interested in the Pelton Water-Wheel Company in any other way than as chief engineer?

A. Yes, sir; I was a stockholder and director of the company many years and I am still a stockholder.

Q. 203. You stated that you made the first examination of the Lyndon patent four or five years ago. Upon what occasion was that examination made?

A. On the occasion of Mr. Lyndon threatening the Pelton Water-Wheel Company with a suit for infringement of the present patent No. 695220.

Q. 204. Did he ever institute that suit?

A. I don't know.

Q. 205. As one of the directors of the Pelton Water Wheel Company and as its chief engineer, what action did you take with regard to that threat of suit?

Mr. Blakeslee: Objected to as assuming an official function which is not shown to have existed in any manner.

A. It did not come within my duties to take any action.

Q. 206. By Mr. Westall: As one of the board of directors was the question of the infringement of the Lyndon patent ever taken up by your board?

A. Not that I know of.

Q. 207. So that the letter that was received by the Pelton Water Wheel Company was not taken up officially by the company but was disregarded? Is that true?

A. I don't know whether it was disregarded or not. My only connection with the matter, to make it clear, was that the Lyndon patent was referred to me and I was asked if it was such a patent as we had infringed.

Q. 208. Who referred it to you?

A. As I recollect it now, it was referred to me by Mr. Edward L. Brayton, who was at that time vice-president and manager of the Pelton Water Wheel Company.

Q. 209. And what report did you make to Mr.

Brayton in regard to the alleged infringement of the Lyndon patent?

A. I don't remember what report I made to him at the present moment, because, as my recollection exists now, it was that Mr. Lyndon threatened infringement proceedings based on some devices that he had seen or claimed that he had some knowledge of; and, as I recollect it, these were not specified with a sufficient degree of accuracy to enable me to make any intelligent deductions as to whether or not we did infringe. I gave the Lyndon patent at that time very little attention, expecting some specific instances or references which would enable me to arrive at some reasonable conclusion as to whether or not we did infringe. That, at any rate, is my present recollection.

Q. 210. You are sure that you did not recommend to the board that they take a license under the Lyndon patent at that time, are you?

A. It was not referred to me by the board. I did not make any recommendation to the Pelton Water Wheel Company or any of its officials at that time that they take a license, because I was not sufficiently posted on the alleged infringement alleged by Mr. Lyndon, to make any such report.

Q. 211. You say that you examined the Lyndon patent very thoroughly at that time?

A. No, sir; you are mistaken. I did not say that. I said that the examination that I made was a very thorough examination before I bought it.

Q. 212. Taking up the Lyndon patent in suit, I will ask you to point out and indicate the water-gate-operating shaft.

A. Shaft 20 is the water-gate-operating shaft.

Q. 213. Referring now to the drawings and illustrations of the alleged infringing structures, where do you find the water-gate-operating shaft?

A. In the Cottonwood plant apparatus the water-gate-operating shaft is shown in Exhibit E by the letter D. In Exhibit F it is shown by the letter D, ~~and in Exhibit F it is shown by the letter D,~~ and in Exhibit G it is shown by the letter D. At the Division Creek plant the water gate shaft is shown in Exhibit H, I and J by the letters LL. I might state that there are several shafts, or moveable members which might readily be called shafts interconnected. For example, in Exhibit G there is a shaft shown also across the governor. The line X might be called a water-gate-operating shaft. And in Exhibit H the shaft HH might be called a water-gate-operating-shaft. But these second shafts that I have mentioned in both cases are connected to the ones first mentioned so that movement in one produces movement in the other by well known mechanical connections.

Q. 214. What part of the patent in suit is meant by the element of Claim 1 called a "driving shaft"?

A. I would say that shaft 6 in Fig. 1 is the driving shaft.

Q. 215. Please point out and indicate where you find such an element in the alleged infringing device as shown by the drawings and photographs which you have produced?

A. I would say that shaft 6 which I have mentioned above is connected by gears to shaft 3.

Q. 216. Please read my question.

(The Examiner reads the question.)

A. Shaft carrying pulley DD in Exhibit J and in Exhibit H and Exhibit K, and carrying the pulley H in Exhibits E and G, is the mechanical equivalent.

Q. 217. Please point out in the patent in suit the reversing-clutch gear adapted to connect the water gate operating shaft to the driving shaft in reverse driving relations in the patent.

A. The mechanical equivalent?

Q. 218. No; in the patent.

A. Such reversing gear exists in the Lyndon patent, Figure 1, in the reversible clutch connecting gears 9 or 10 in mesh with gear 11.

Q. 219. Please now indicate and point out in the alleged infringing structures a reversing clutch gear adapted to connect the water gate operating shaft and the driving shaft in reverse driving relations.

A. The mechanical equivalent of such reversing gear is shown at cylinder FF in Exhibit H and J, and in the reversing cylinder W in Exhibit G.

Q. 220. Have you mentioned all the elements which you consider to be the mechanical equivalents of the reversing-clutch gear adapted to connect the water-gate-operating shaft to the driving shaft in reverse driving relations?

Mr. Blakeslee: Objected to as indefinite. Does the question mean in any part of the deposition or in the cross-examination?

A. Reversing-clutch gear is adjusted by two elements, the gears mentioned before and the clutch which sets one or the other of said gears into operation. It is therefore necessary in answering your question to show the device which sets into operation the cylinders I have

mentioned as the mechanical equivalents. These cylinders are properly the mechanical equivalents of the gears and the mechanical equivalent of the clutch which engages one or the other of these gears is the valve or controller actuated from the fly balls. This valve is not shown in the photographs for the reason that it is contained within the body of the casting and can therefore not be seen. But such valve does exist inoperative combination with said cylinder with such controlling means from the fly balls.

Q. 221. By Mr. Westall: How many parts in the alleged infringing device are contained in what you consider the mechanical equivalent of the reversing-clutch gear adapted to connect the water gate operating shaft to the driving shaft in reverse driving relations?

A. Two devices.

Q. 222. What are they?

A. I think I have already specified those two, haven't I?

Q. 223. I don't believe you have.

A. The cylinder and its connections and the controlling valve and its connections for setting the piston within the cylinder in operation. The cylinder obviously containing a piston and piston head, to produce movement in the water-gate-operating shaft.

Q. 224. You have said "cylinder and its connections." What do you mean by "connections"?

A. I mean the piston head and piston, the ports to the controlling valve, the controlling valve and its casing, and we must, of course, presume a power fluid admitted and discharged under the control of the controlling valve in one direction or the other to produce move-

ment of the piston rod in either direction, and, therefore, reversible in the said cylinders.

Q. 225. Then, if I understand you correctly, the reversing-clutch gear adapted to connect the water-gate-operating shaft to the driving shaft in reverse driving relations finds its equivalent in the two devices you first mentioned and in the different connections and parts which you mentioned in your last answer? Is that correct?

A. I do not understand that there is any discrepancy between the answers.

Q. 226. I am trying to find out all the parts taken together which you consider to represent or to be the mechanical equivalent of the reversing-clutch gear adapted to connect the water-gate-operating shaft and the driving shaft in reverse driving relations.

A. Then I must add to my answer before the last. The mechanical connections between the said piston rod and the water-gate-operating shaft indicated, for example, in Exhibit H by the rack and quadrant, mounted upon the shaft HH, the lever mounted thereon, the connecting rod II, the lever KK, mounted upon the water-gate-operating shaft LL.

Q. 227. Will you now briefly mention each and every of the parts separately that in your opinion, taken together, are the mechanical equivalent of the reversing-clutch gear.

A. In my last three answers I have gone further than specifying the elements which you have now asked, in that I have specified certain of the operating devices in connection with them. The reversing-clutch gear which you now ask me explicitly about, and exclusive of all

other elements, I will say, is contained in the power cylinder FF, for example, of Exhibit J, its piston head contained therein and piston rod extending therefrom.

Q. 228. Then, if I understand you correctly, the cylinder and cylinder head and piston and the piston rod, in your opinion, constitute the mechanical equivalent of the reversing-clutch gear adapted to connect the water-gate-operating shaft to the driving shaft in reverse driving relations. Is that correct?

A. Yes, sir.

Q. 229. Can the mechanism you have pointed out be described as connecting the water-gate-operating shaft to the driving shaft in reverse driving relations?

A. No, sir. That was not your previous question. Your question before was "adapted to connect" and now you ask me if they are connected. In order to get the connection between the reversible cylinder and the operating shaft, it is necessary to take several other steps.

Q. 230. Then can the mechanism which you have pointed out be described as adapted to connect the water-gate-operating shaft to the driving shaft in reverse driving relations?

A. Yes, sir; because the reversal of the gate operating means takes place directly through and because of the parts I have mentioned.

Q. 231. What part or parts do you understand are meant in Claim 1 of the patent in suit by "means for reversely controlling the operation of such clutch 'gear'?"

A. "Means for reversibly controlling such clutch gear" is a power fluid for transmitting movement to the

piston head and piston rod, a valve for controlling the flow of such power fluid to the cylinder mentioned, connections from such controlling valve to the fly balls or speed-sensitive device.

Q. 232. Do you find anything in the alleged infringing structures which you have described and stated corresponding to "a dynamo connected to be driven from the water wheel and wound to maintain constant potential for varying currents therein, but to vary the potential in a greater ratio than the speed?"

Mr. Blakeslee: Objected to as indefinite in the choice of the term "corresponding."

Mr. Westall: I am quoting the claim.

A. The fly balls are responsive to changes of speed but are not an electrical device in any other sense of the word. They perform the same function as the electrical device and in substantially the same manner.

Q. 233. Then I understand that you do not find a dynamo such as I have described, and wound in the manner in which I have described?

A. No; I find the mechanical equivalent operating the governor.

Q. 234. What is the mechanical equivalent for such a dynamo?

A. The fly balls sensitive to speed variations, and shown in many of the photographs—for instance, letter G on Exhibit E and G; letters CC in Exhibits K and H.

Q. 235. Are the fly balls alone in your opinion a mechanical equivalent of the dynamo wound as described in Claim 1, or are there other connecting devices which

must be included in order to make the fly balls the mechanical equivalent?

A. I should say they are the mechanical equivalent as they stand with the springs which separate them, and the rotating head by which they are rotated in order to cause a sensitiveness to speed. They are particularly constructed and designed to produce a considerable movement on a slight speed change and are very sensitive to speed variations.

Q. 236. Then the fly balls alone cannot be considered a mechanical equivalent, but you must take in, if I understand you correctly, the springs—

A. (Interrupting)—which separate the fly balls.

Q. 237. In what respect do the springs separate the fly balls?

A. I don't know how I could describe it other than to say that the balls are mounted upon flat steel springs which springs are rotated with the fly balls, and as the speed increases the fly balls through centrifugal force bend the springs outwardly and shift the valve rod, and as the speed reduces, the steel springs draw the fly balls in, the centrifugal force under reduced speed not being sufficient to hold the balls out under the spring tension.

Q. 238. How are the fly balls actuated or moved?

A. They are driven from a set of gears from a shaft carrying a pulley, which pulley in turn is driven from the water wheel shaft, so that the fly balls rotate at a speed directly in proportion to the speed of the water wheel shaft.

Q. 239. Then would it not be proper to include the pulley and its shaft and the connections with the fly

balls as part of the equivalent to the dynamo wound as described in Claim 1?

A. No, sir. Do you want to know why? Because the dynamo is separate and distinct from its pulley and its belt and its driving shaft, just as the fly balls are.

Q. 240. Is the shaft that extends into the dynamo a part of the dynamo in your estimation?

A. Yes, sir.

Q. 241. But, as I understand you, the shaft that operates the fly balls would not correspond as the mechanical equivalent of the shaft that operates the dynamo.

A. Yes, sir; but not with the dynamo shaft. The dynamo is operated by a pulley and belt from another shaft just as the fly balls are operated by a shaft and pair of gears. The fly balls' springs are carried on a collar which performs all the functions of the dynamo shaft, and the spindle on which the fly balls operate might be termed more nearly the mechanical equivalent of the dynamo shaft than any other portion of the fly ball mechanism.

Q. 242. Do you find in any of the alleged infringing structures as illustrated by the photographs and drawings which you have produced, an electro-magnetic device connected to such dynamo, and controlling the clutch-gear-controlling means?

A. No, sir.

Q. 243. You don't find any such element?

A. I find such an element, but no such electro-magnetic element. The mechanical equivalent in the alleged infringing structures I find in the connections between the fly balls for transmitting movement to and making

sensitive to speed changes the controller or valve which puts into reversible movement the piston head and piston of the cylinder previously testified to and, as such, forming a reversing-clutch means, and, therefore, the mechanical equivalent of the devices you have mentioned in the Lyndon patent.

Q. 244. If I understand you correctly, you consider the electro-magnetic device connected to such dynamo, and controlling the clutch-gear-controlling means, finds its equivalent in the connections of the fly balls.

A. No, sir; in the valve actuated from the fly balls through suitable connections.

Q. 245. Will you please point out each and every part which you conceive to be taken together to constitute the mechanical equivalent of the electro-magnetic device connected to such dynamo, and controlling the clutch-gear-controlling means.

A. I consider the element marked "controller" on Exhibit ZZ said equivalent.

Q. 246. And what would you include in the controller

A. The valve which is marked "controller," as stated in my previous answer, and its casing, and parts surrounding it, in co-operation with which it moves.

Q. 247. Where, if at all, do you find in said alleged infringing device means for resisting the action of said electro-magnetic device in such manner, that at normal speed the clutch mechanism will be disengaged, but on increase or decrease from normal speed the clutch will be operated to govern the water-gate through its operating shaft.

A. Such device is indicated in ZZ by the vertical con-

necting rod between the fly balls and screw threads on the valve stem, which rod is indicated in its lower portion by Y-G and forms the valve stem.

Q. 248. Please indicate by reference to the drawings of the patent in suit what part you believe is meant by "electro-magnetic means controlling such clutch gear" as used in Claim 2.

A. The electro-magnetic means controlling the clutch gear in the Lyndon patent, I should say, is the solenoid 33.

Q. 249. If you find such an element in the alleged infringing devices, please point it out.

A. As I have previously pointed out, I consider the element marked "controller", and which I now mark with red pencil "controller" on Exhibit ZZ.

Q. 250. Will you point out the part which you have marked in response to the last question in the photographs of the alleged infringing structure?

A. As I have previously testified, the controlling value which is the equivalent means is inclosed within the governor structure or castings and, therefore, cannot be seen in the photographs. The approximate location of said controller is, in Exhibit J, indicated by the letters EE; in Exhibit G at a point slightly below Y. The valve stem being shown clearly just above Y which actuates this controller.

Q. 251. Do you find in any of the alleged infringing structures a dynamo wound so as to deliver an electromotive force varying in a greater ratio than the speed of the water wheel?

A. No sir.

Q. 252. Will you find what you consider the mechanical equivalent of that dynamo?

A. Yes, sir. The fly balls, as previously testified.

Q. 253. Do you find in the infringing structure a solenoid that connects it to said dynamo, and, if so, where?

A. No, sir; but I find the machanical equivalent in the controller, so labeled on Exhibit ZZ.

Q. 254. Do you find in any of the alleged infringing structures a device controlled by said solenoid and carrying a contact device, and energizing connections for the electro-magnetic gear-controlling means, controlled by said contact device?

A. I do not find a solenoid, but, as previously testified, its mechanical equivalent is the controller, as labeled on Exhibit ZZ. The electrical connections and current flowing in them are directly comparable to the pipe connections or parts to the water-gate-operating means and the power fluid engaged in the action of the controller for the purpose of shifting the piston head and piston rod in the said operating cylinder.

Q. 255. Will you please briefly mention all the parts that you conceive to be the mechanical equivalent of a device controlled by said solenoid and carrying a contact device, and energizing connections for the electro-magnetic gear-controlling means.

A. I have mentioned them in my last answer, which I now repeat.

Q. 256. Taking up Claim 3 of the patent in suit, please mention briefly and indicate by the reference letters heretofore employed or any other marks, if neces-

sary, without, however, endeavoring to explain their operative connections and relations, the parts in the alleged infringing structures which you conceive to be covered by the part of Claim 3 reading "a water-gate-operating shaft, and means for operating same in either direction to govern the water-wheel".

Mr. Blakeslee: This question is objected to as calling for a mere repetition of the testimony given by the witness upon direct examination and counsel is referred to his answer in that respect.

A. Referring to Exhibit ZZ, I have marked in red pencil "water-gate-operating shaft", and I have marked thereon "means for operating same in either direction to govern the water wheel."

Q. 257. The claim also calls for a controller for said operating means responsive to changes of speed of the water wheel. Where, if at all, do you find that element in the infringing device?

A. I have marked "controller" in red pencil, during one of my previous answers, and I now write thereunder the words "responsive to changes of speed of the water-wheel" on Exhibit ZZ.

Q. 258. Please point out and briefly indicate the part or parts in the alleged infringing device which in your opinion are the mechanical equivalent of a returning device for said controller provided with a clutch connection to said operating shaft.

A. I have marked in red pencil on Exhibit ZZ "the returning device for said controller provided with a clutch connection to said operating shaft," and have pointed with an arrow to said clutch means.

Q. 259. Will you please elucidate a little more fully what parts you intend to be taken in by the arrow which you conceive to be the equivalent of the clutch?

A. A clutch is a device for picking up or interrupting or intermittently transmitting movement between two members. This is exactly the function performed by the dashpot.

Q. 260. If I understood you correctly, then the clutch includes the dashpot with its piston and rod and other connections. Is that true?

A. Yes, sir.

Q. 261. What other connections are there besides the piston and rod?

A. There is a pin and a connection to the rack and pinion of the returning device and through said pinion to the screw threads shown at the upper portion of the valve stem and within the fly ball element.

Q. 262. Do I understand you to add the parts that you have just mentioned to your previous answer as being part of the devices which are equivalent to the clutch?

A. No, sir. You asked me what parts were connected to the clutch, I understood.

Q. 263. In a previous question, if I understood you correctly, you stated that in your opinion the clutch found its equivalent in the dashpot, the piston, the piston rod and certain connections. What connections?

A. The connections from the piston rod that are shown clearly in the drawing and extend all the way down to the water-gate-operating shaft, the main operating piston and the connection from the clutch to the

same means that the clutch sets into operation as, for example, the connection between the piston rod and the rack.

Q. 264. I am asking you what you consider is the mechanical equivalent of the clutch only.

A. I cannot consider a clutch without considering the clutch connected with something to do something. The clutch alone, if we could eliminate all else, would consist of the piston and piston head and cylinder within which the piston operates, and the body of fluid therein contained.

Q. 265. What is commonly understood by a "clutch?"

Mr. Blakeslee: Objected to as calling for a repetition of recent testimony.

A. I believe I gave that.

Q. 266. By Mr. Westall: Do you find in the alleged infringing structures "means actuated by said controller on movement thereof from normal position to engage said clutch with said shaft"?

Mr. Blakeslee: This question is objected to as further calling for mere repetition of the previous testimony of the witness, and objection is made to padding the record with such repetitious testimony.

Mr. Westall: Counsel for the defendant calls attention to the fact that this claim is alleged to be infringed, and that the witness has testified that the alleged infringing structures are an infringement of it. I am only asking him to point out where he finds the particular elements mentioned.

Mr. Blakeslee: And he has so pointed out.

A. Yes, sir; I find such means in the parts I have circled with a red pencil, and, as referring to it, I have written on Exhibit ZZ the words "means actuated by said controller on movement thereof from normal position to engage said clutch with said shaft, so as to cause the return of the controller to normal position and interrupt the governing action before it has over-run the proper amount."

Q. 267. Please indicate upon the alleged infringing devices as shown in the illustrations what you conceive to be the controller mentioned in Claim 3.

Mr. Blakeslee: Objected to as calling a third time for the same testimony which the witness has already given.

Mr. Westall: Counsel for the defendant states that this question is in reference to another claim where the word "controller" might possibly have a different meaning, and it is in reference to the language of this claim that the question is repeated.

Mr. Blakeslee: Well, if counsel wishes to differentiate between the meaning of the word "controller" as used in one claim and the meaning of the word "controller" as used in another claim, or to try to so differentiate, or have the witness so differentiate, let him specify the claims or specify the relation of such word "controller" to something else in some manner so that such differentiation may be understood or made possible.

Mr. Westall: Counsel does not wish to differentiate in any way in asking for the testimony of the witness who will do the differentiation if there is any differentiating to be done.

Mr. Blakeslee: We object to the repetition of ques-

tions concerning the location or embodiment of parts defined by the same language after such location or embodiment had been once pointed out, as being a mere idle waste of space in the record and of the time of counsel for complainant, and as serving no useful purpose, and as amounting to exhaustive cross-examination.

A. I have already so marked the controller "controller" on Exhibit ZZ.

Q. 268. By Mr. Westall: Will you please look at Claim 4 of the patent in suit and state whether or not the elements there mentioned find their equivalents in the parts you have previously pointed out in response to the prior questions concerning those other claims.

Mr. Blakeslee: Objected to as indefinite and vague and calling for testimony comparing a thing with itself and in effect calling for testimony which has already been given. There must be some definite standard of comparison before such question is proper. The question is further objected to as entirely too general to permit of a specific answer and as possibly leading the witness into a maze in which he will never be able to determine whether or not he has passed through it, and each and every other objection previously made is addressed to this question.

A. Are you referring to questions I have replied to in cross-examination only?

Q. 269. I am. I will state that I am merely endeavoring to shorten the proceedings by having you testify that the elements previously pointed out are—

A. I believe the elements I have previously pointed out in connection with Claim 3 and described and writ-

ten in red pencil upon Exhibit ZZ, as previously testified to, are the elements contained in Claim 4 with the difference that actuating means controlled by said controlling means to return the controller to inoperative position so as to prevent excessive movement of the governor, being the latter portion of said Claim 4, might for the sake of clarity be better described as the spring and finger parts acting against the rack, and (which spring and finger parts I have marked "actuating means Claim 4.")

Q. 270. Do you find in any of the alleged infringing devices a reversing clutch gear adapted to connecting a water-gate-operating shaft and a driving shaft so as to cause the water-gate-operating shaft to move in either direction?

Mr. Blakeslee: Objected to as calling for another repetition of testimony previously given by the witness.

Mr. Westall: Counsel for the defendant calls attention to the fact that each claim is slightly differently worded and we are following the language of each claim.

A. Yes, sir. Referring to Exhibit ZZ and to Claim 5 of the Lyndon patent, I find the water-gate-operating shaft which I have numbered 1 in red pencil, a driving shaft which I have marked "driving shaft", a reversing clutch gear which I have marked 2, and lettered as indicated in Claim 3, which is adapted to connect said shafts so as to cause the water-gate-operating shaft to move in either direction. There is here a departure from the structure alleged to infringe in that the inter-connecting parts—while movement is brought about from the driving shaft to the water-gate-operating shaft through

the instrumentality of the reversing cylinder and piston, the equivalent of the reversing-clutch gear,—the said connections are numerous and the movement from the driving shaft to the water-gate-operating shaft, while actually brought about by said reversing means, is not as clearly defined as in the other claims.

Q. 271. Do you find in said alleged infringing device a “dynamo operatively connected to produce an electro-motive force responsive to the speed of the water wheel”?

Mr. Blakeslee: The question is objected to as calling for a repetition of testimony previously given. And counsel’s attention is called to the fact that the witness has testified that in no part of the infringing structures does he find or has he found a dynamo, irrespective of its qualifications as in this claim or in any other part of the patent.

Mr. Westall: I think the witness will understand that when I ask if he finds such an element that I am intending that he shall state whether or not he finds the mechanical equivalent of said device.

Mr. Blakeslee: If the witness is desired to point out mechanical equivalents, it is easy to frame a question to that end.

A. I do not find such a dynamo. Its mechanical equivalent, as previously testified, is an element in the infringing device responsive to speed changes and consisting of fly balls and their immediate associated parts.

Q. 272. By Mr. Westall: Do you find a solenoid device energized by said dynamo, a core for such solenoid, a circuit controller actuated thereby, springs for holding

the circuit controller in normal position, two electromagnetic devices for reversely operating the reversing clutch gear?

Mr. Blakeslee: The same objection.

A. I do not find these electrical elements or electrically operated elements, but I find their mechanical equivalent in the parts previously testified to.

Q. 273. By Mr. Westall: Do you find a returning device adapted, when operated, to return the circuit controller to normal position?

A. I do.

Q. 274. Please indicate where.

A. The returning device is indicated as element 3 in red pencil and marked "returning device," etc. on Exhibit ZZ.

Q. 275. Is that adapted, when operated, to return the circuit controller to normal position?

Mr. Blakeslee: Objected to as repetition of the previous question.

A. Yes, sir; in the sense that "circuit controller" here is a controller marked "controller" in that it controls the circuit of oil as distinguished from an electric circuit.

Q. 276. By Mr. Westall: Do you find a clutch adapted to bring said returning device into operative connection with the water-gate-operating shaft?

A. I do, and have marked such as "means actuated by said controller", etc., in the Exhibit ZZ.

O. 277. Do you find a magnet controlling said clutch?

A. No, sir; but I find its mechanical equivalent in the

means for operating the valves which I have circled with red pencil on Exhibit ZZ.

Q. 278. Do you find a circuit for said magnet including a circuit closer?

A. No, but I find the mechanical equivalent in the mechanical connections which might be termed a circuit of mechanical connections, and which set into operation and cause the movement of the valve circled with red pencil for the purpose of varying the rate of flow in the oil cylinder or clutch.

Q. 279. Will you mention specifically the parts that you conceive to be the mechanical equivalent of the circuit for said magnet?

A. I have marked the parts which I consider the mechanical equivalent of the word "circuit", with the words "Mechanical circuit on Claim 5."

Q. 280. Do you find a circuit closer or its mechanical equivalent in the circuit that you have pointed out?

A. No, sir. The mechanical equivalent of the electric circuit closer is the movement produced upon a movement of the "mechanical circuit" which sets into movement the valve which has been circled with red pencil.

Q. 281. You find a specific part of the mechanism which you would call a circuit closer, or which you would indicate as the mechanical equivalent of the circuit closer, do you?

A. Yes; I certainly do, because the Lyndon patent in the circuit which is closed to produce the movement now under discussion, is the movement which sets up the operation or starts the train of mechanical movements which cause the operation of the clutch. Such move-

ments are set up and started very distinctly in the present case by the movements of the part marked "mechanical circuit Claim 5", and the parts marked "actuating means Claim 4".

Q. 282. Would you mention specifically just which part of the devices you mention that you would say is the equivalent of the circuit closer?

A. The circuit closer is a lever which swings and the parts marked "mechanical circuit Claim 5" are levers and rods which swing, and, as such, they perform the same function and in the same manner, in that they bring about the setting into operation at the clutch at a variable rate of speed through the valve circled with red pencil.

Q. 283. Then, if I understood you correctly, the mechanical circuit which you have pointed out embraces a circuit closer which consists of the same elements which you have pointed out as forming the circuit? Is that correct?

A. Yes, sir; the mechanical circuit consists of the devices which cause the closing and setting into movement of the mechanical circuit.

Q. 284. Then the circuit of said magnet and the circuit closer are identical in the mechanical means which you have pointed out?

Mr. Blakeslee: The witness is being asked as to the terms of Claim 5, as I understand it, and that claim distinctly calls for "a circuit for said magnet, including a circuit closer." This last question is objected to as tending to mislead the witness upon the very matters that are set before him in the inquiry.

A. They are, to this degree: that the circuit of said magnets in the Lyndon patent is a train of metal or wire or rods or electrical conductors. The circuit closer is a swinging arm. The mechanical circuit that I have mentioned as the equivalent of the circuit and of the circuit closer is a series of metal rods and levers and connections to produce the same results, although in a slightly different way.

Q. 285. By Mr. Westall: Then you cannot point out any particular part of the mechanical circuit which you have mentioned, as being the mechanical equivalent of the circuit closer?

A. No better than I have already done in my previous answers.

Q. 286. Is the circuit closer which is included in the circuit pointed out by you operatively connected with the circuit controller and adapted to energize the magnet on movement of the circuit controller in either direction?

A. As previously testified, there is no magnet or electrically operated device in the alleged infringing apparatus governing mechanism.

Q. 287. Is there any mechanical equivalent in the alleged infringing devices of the circuit controller adapted to energize the magnet or movement of the circuit controller in either direction?

A. Yes, sir; the means which I have marked "mechanical circuit, Claim 5" on Exhibit ZZ is adapted to set into movement the clutch device whenever movement occurs in the means for reversible operation of the gate shaft.

January 24, 1914, A. M.

Mr. Blakeslee: Counsel for defendant having as yet not performed, complied with or responded with respect to the notice and demand heretofore given on the record to produce and submit to complainant all its papers, maps, specifications, blue prints, records and other things pertinent to and disclosing the inter-relation and operation of the hydro-electric plants of the defendant in Inyo County, California, known as and referred to in these proceedings as the Cottonwood Plant and Division Creek No. 2 plant; and there having similiarly been no response to or compliance with the notice and demand similarly heretofore given to open to the inspection of complainant and facilitate the examination and inspection of the hydro-electric plants, just mentioned,—all for the purpose of getting before this court in as concise, complete and satisfactory a manner as possible the issues involved in this suit as certainly most fully developed by the testimony taken to date concerning said mentioned plants,—we now give counsel for defendant here present notice of a motion to be presented at the court room of this court, in the Post Office Building, in Los Angeles, California, at the hour of 10:30 o'clock A. M. of January 29, 1914, for an order commanding the defendant to produce for the purposes above mentioned all books, records, specifications, drawings, blue prints and other things hereinbefore upon the record enumerated in this respect, for the purpose of shaping, defining and proving the issues in this suit; and for a further order permitting complainant to fully examine and inspect the enumerated plants and the parts and details thereof,

both at rest and in motion and under and by the assistance of those habitually in charge of and fully versed in the construction and operation thereof.

And we further give counsel for the defendant here present notice as of the same hour, day and place, of a motion for an order extending the time for complainant to complete his *prima facie* proofs herein, for a period of ten days from and after the date of the expiration of the time within which the complainant herein under present stipulation is to complete his *prima facie* case.

The said motions to be presented to the Honorable Judge of this court at the time herein specified, to be then and there heard or as soon thereafter heard as the Honorable Judge of the court may direct or find convenient and practicable, either in open court or in chambers.

Mr. Westall: Counsel for the defendant denies that there has been any demand thus far made for an inspection of the plants referred to by counsel, and insists that the demand heretofore made for the production of certain blue prints, papers, records, etc., has been vague and indefinite, and plainly shows upon its face that compliance with any such demand would result in putting into this record a large amount of evidence which could not be otherwise than entirely irrelevant to any issue in this case.

Mr. Blakeslee: It is further noted that defendant through present counsel, quite contrary to the attitude of counsel heretofore in the case for defendant, has not volunteered or offered to comply with the definite and clear demands heretofore made in any respect whatsoever, and has not at any time adverted to such demand

nor proffered any assistance in enabling the inspection of the plans, specifications, drawings, blue prints and other records and things demanded, even in spite of the communication directed to present counsel by the office of the city attorney of the defendant sent to present counsel as an act in good faith with respect to the understandings between complainant and defendant while the city attorney's office and counsel Lyon were handling the defense of this case. And we specifically charge the defendant through its present counsel with a lack of that good faith and reasonable dealing as between parties which in a court of equity, of all courts, is to be expected as among practitioners, and usually is found.

Mr. Westall: Counsel for the defendant states that he does not understand his function as the representative of defendant places upon him any duty to volunteer or to offer assistance to complainant in any way in making out his case. Counsel for the defendant also states that no request or demand except indirectly has been made of him for an inspection of the plants, as the records will show, but it has been assumed constantly by counsel for the complainant that there was objection to inspection or to production of proper evidence vital to the issues of this case on the part of counsel for the defendant, which, it is submitted, the record clearly shows is not the case. Whenever a demand or a request is made in proper form for something definite, counsel for the defendant will certainly put no obstacles in the way of the production of evidence which is pertinent or material to the present inquiry. But the defendant certainly does object to the filling of the record with a large mass of

matter which can have no pertinency to the issues herein involved.

Mr. Blakeslee: We stand on the record which speaks fully as to the demands under consideration.

insert Q. 288 Mr. Henry, what do you understand by the term "water gate"?

A. A valve for controlling the discharge of water.

Q. 289 Then the valve controlled by the by-pass of the patent in suit is a water gate under that definition?

A. It is also a water gate by that definition. The same is true of the by-pass valve in the Lyndon patent under this definition. The definition is a broad one.

Q. 290 It would also include, would it not, the needle valves you have described and as shown in the Exhibits line drawings U₁ and V, would it not?

A. They might be so termed.

Q. 291 You say they might be so termed. Would you say that they could properly be so termed?

A. They could properly be so termed, but are not so termed is the Lyndon patent, at Mr. Lyndon distinguishes between the two devices, both of which might properly be called water gates under the definition I have just given you. His object in distinguishing between the two devices is fully set forth in the patent.

Q. 292 You would consider the main nozzle with its needle properly referred to as a water gate, would you not?

A. I would consider that that might be one way

346 4 add line 41½ “Geo. J. Henry was thereupon
recalled and his cross examination resumed.
Cross examination (resumed). By Mr.
Westall”

of properly describing a nozzle, with its needle, although it is a little broad, as a needle and nozzle are a specific type of water gate. The word "water gate" is almost generic as a different definition of a large variety of devices performing the functions of controlling the flow of water.

Q. 293 Do you consider the by-pass valve of the patent in suit finds its mechanical equivalent in the needle valve described by you and shown in the line drawings U and V?

A. By the needle valve in Exhibits U and V described as by-pass valves or by-pass needle valves.

Q. 294 When you use the words "inverse operation of the by-pass valve and the water gate" as applied to the device shown in the line drawings U and V, do you mean the same thing that you do when you speak of the inverse operation of the by-pass valve and water gate of the patent in suit?

A. I do, with the following limitations: that during governor movement the same action takes place, and that subsequent to movement of the governor mechanism the by-pass valve in the Lyndon patent is broadly described as taking up a normal position. Normal position means the position which it is set for the by-pass valve to occupy to prevent inertia effects that would be encountered in the governing and control of the plant. It is obvious that normal position may, therefore, be a different point in different installations due to variable factors which enter into the consideration in each case. Mr. Lyndon has given and described clearly one case and has also

shown clearly the advantages to be derived in all cases, and the adjustable possibilities which are perfectly apparent to one familiar with the art at the time of his invention.

Q. 295 If I understand the testimony by you on direct examination, your idea of the operation of the by-pass valve and the water gate of the Lyndon patent in suit is that every slight variation in load or in speed of the water wheel causes a movement of some kind of the water gate and an inverse movement of the by-pass valve.

A. No, sir; you are not correct.

Q. 296 Do I understand you to say that an increase or decrease in the load of the main shaft would not result in a movement of the by-pass valve and water gate of the Lyndon patent in suit?

A. If the movement of the water gate was slight the Lyndon apparatus would be adjusted so that no movement of the by-pass would occur. Mr. Lyndon distinctly states that the by-pass valve and the by-pass are for the purpose of preventing inertia effects damaging to the governor control.

Q. 297 So that you concede that Mr. Lyndon contemplated an adjustment of his device which would permit the water gate to be moved without a corresponding inverse movement of the by-pass valve under certain conditions?

A. That is correct.

Q. 298 Where in the Lyndon patent in suit do you find any suggestion that Mr. Lyndon had in mind an adjustment which would permit the movement of

the main water gate without any corresponding movement of the by-pass valve?

A. I find no direct statement by Mr. Lyndon to that effect. Mr. Lyndon is adding something to the art that will take care of a condition not previously taken care of in a satisfactory manner on turbine water wheels, and as such he describes its functions and means of operation and various elements for the purpose of accomplishing such ^acondition. It does not follow therefrom that his governor is inoperative under those conditions which do not call for such elimination of damaging inertia effects, and he would unnecessarily hamper the record if he attempted to inject into his patent application devices so familiar and well known and means of regulating and adjusting devices so familiarly and well known in the art that anyone even partially skilled in the art as it existed at the time of his patent would be familiar with without half thinking.

Q. 299 Referring to the line drawings, Exhibits U and V, please state what you conceive to be the normal position with respect to being open or closed of the by-pass valve water gate?

A. The by-pass water gate in the case of Exhibit U I should consider to be closed normally during periods of governor inoperation. That is, after the governor has operated, the by-pass in Exhibit U, and at the Cottonwood plant is permitted under the action of the dashpot and dashpot springs and water pressure against the needle valve to resume practically complete closure. This, you will note, is at the end

and after the governing takes place,—after the governor action has ceased. During the periods of governor movement involving water gate movement for controlling water to ^{the} water wheel, such that they are are to a material degree apt to, and would, without use of the by-pass, produce damaging inertia effects to the pipe, the by-pass is off of its seat, to a greater or less degree; and during periods of movement backwards and forward of the water gate while such considerable load change, and, therefore, speed change, is occurring, we have the by-pass valve operating inversely to the water gate in both directions. For example, in Exhibits U—and I might say the same testimony applies to Exhibit V throughout this answer —if a dredger bucket is plunged into the earth we have a considerable opening taking place at the water gate to admit a greater quantity of water onto the water wheel to meet the increased load. The water gate in such a case is open to a greater degree than that necessary to maintain the dredger bucket added load after it has once brought the wheel back to speed. The first operation is, therefore, an opening of the water gate and practically no movement of the by-pass valve as the head is great on the pipe line and the water responds under the action of gravity as quickly as the governor moves the gate into opening direction. There is, therefore, no necessity for having had the by-pass open before this initial movement. We now have the main water gate open to a large degree, the speed of the apparatus now being in the act of being built up, the dredger motor get-

ting up its speed. As the dredger motor approaches its speed, it requires less power. The water gate is therefore caused to move in a closing direction through the action of the speed-sensitive means and controller, and while it is moving in its closing direction the by-pass is pulled off of its seat, being the inverse movement to that of the water gate, and for the purpose of preventing the inertia effect or water-ram in the main pipe line. It is now performing the exact function described and specified and claimed by Mr. Lyndon; and as the dredge motor arrives at its correct speed and the shovelful of dirt, or chain of buckets (if it be of the latter type) begin to ascend, we have the load again increasing and the water gate moving in an outward direction, and synchronously with such movement the by-pass moving in a closing direction inverse to the water gate, being the exact movement that takes place and is described by Mr. Lyndon, and hence we have through the cycle of operations above mentioned which are not only commonly met with in practice but met with a great many times in a day and during operation of the load of the dredgers on the aqueduct plants must have been met with many times in an hour, exactly as described by Mr. Lyndon, namely, the water gate controlling the flow of water to the water wheel, moving in a closing direction and the by-pass opening, and vice versa, the water gate opening and the by-pass closing synchronously therewith during the action of the governing, to prevent inertia effects. The cycle of operations which I have here described

take place within a very few seconds of time and long before the by-pass has been moved to a material degree in its closing direction under the action of its oil dashpot and springs. In such a plant as the Cottonwood plant and Division Creek No. 2 plant the by-pass dashpot would be adjusted so that it would probably take not less than a minute or a minute and a half to move through its full closing stroke; and it is therefore evident that during such a cycle of changes as above mentioned the by-pass valve cannot arrive back at its seat in a wholly closed position until some time after the governor movement of the water gate and by-pass has taken place. If the oil dashpot be so adjusted by the adjusting screws thereon so that the port of the oil by-passing around the piston head, as previously testified to, is rapid, so that the dashpot would permit the by-pass valve to make its full stroke in a period of probably less than one minute, we would have an inertia effect in the pipe line supplying the water wheel which would be dangerously high for the safety of the pipe or, at least, defectively high as regards the governing during the critical cycle above specified.

Mr. Blakeslee: In connection with the notice of motion given at the commencement of the present session for taking testimony this morning, I will ask the Special Examiner to certify to the court the record in this case up to and prior to the commencement of today's session and to so certify such portion of the record prior to the morning of January 29, 1914.

Q. 300 By Mr. Westall: If the load carried by

the main shaft is increased, will there be a movement of the by-pass valve in the alleged infringing devices? You can answer the question by yes or no.

Mr. Blakeslee: Objected to as indefinite and incomplete and so broad as to be impossible of a careful and accurate negative or affirmative answer without qualification.

A. Yes; if the movement you speak of takes place during the time that the governor has been acting to correct or a material load change. No, if you mean the entire apparatus has been at rest previously and the action that first takes place on governor movement is as you have described.

Q. 301 By Mr. Westall: And an increase then in the load carried by the main shaft would not always be followed by any movement of the by-pass valve? Is that correct?

A. It is true that it would not always be at the Cottonwood plant. At the Division Creek plant at the time I saw it the by-pass was partially open, and in such case there would be a movement in the closing direction of the by-pass. To summarize, I will say this: In Exhibits U and V if the by-pass valve has occupied a closed position previous to the movement that you ask me about, and the water gate opens, there would under such a condition be no movement in the reverse direction of the by-pass valve. Exactly the same as in the Lyndon apparatus, if the by-pass valve were adjusted so that the weights 69 in dashpot 70 brought the valve 48 back to a closed position, there would then upon the

opening of the gates through the agency of the shaft 20 be no further movement in a closing direction of said by-pass valve 48.

Q. 302 The normal position of the by-pass valve as shown and described in the Lyndon patent is a half-closed position, isn't it?

A. In some places it is mentioned that that would be the position of the by-pass valve; but that must be taken into consideration in connection with Mr. Lyndon's other statement that the governor as herein described is for the purpose of preventing inertia effects in both directions. That is, during opening movement and during closing movement. In the case that you are now asking me about, we have to deal primarily with the inertia effect during the retarding of the water, and the head in these cases is high enough so that we do not have to concern ourselves to any considerable degree with the acceleration of water in the pipe line during an opening movement of the gate valves, as, under the high head, the water gets up to speed in the pipe line as quickly as the governor calls for. This is analagous to a freight train moving on a steep incline or on a very slight incline. If the freight train is on a slight incline, corresponding with a low head, and we release the brakes so as to set it into motion and it is necessary for us to get it into motion quickly, we would put an engine behind it to push the freight train to aid the action of gravity. If, on the other hand, the same freight train was on a very steep incline, there would be no occasion to push it with the engine to get it up

to the same velocity in the same time, gravity under such conditions acting very much more forcibly upon the acceleration of the train movement. The train on the steep track is analagous to an equivalent pipe line under a high head, which is the case at the Cottonwood and Division Creek plants. There is in these plants, therefore, no occasion to artificially accelerate the water in the by-pass. But there is a double reason for providing a by-pass or safety means to aid in the retarding or slowing-up of the water ~~corresponding with the slowing up of the water corresponding with the slowing-up of the freight train~~ by the putting on of the brakes.

Q. 303 If I understand you correctly, the normal position of the by-pass valves in the line drawings U and V is closed.

A. Or nearly closed. At times when the governor has not been in operation for some time. During the actual movement of the governor the normal position or average position of the valve is a partly open position.

Q. 304 Suppose that the load in the main shaft of the water wheel has been decreased. Will there be any movement of the by-pass valve?

A. If the load has been decreased sharply or suddenly to a material amount in proportion to the whole load, there will be a movement of the by-pass valve outwardly as the gate valve or the water gate controlling the water supply of the water wheel moves in a closing direction. This is the most important work that the by-pass valve has to do, and it

is of special importance in the Cottonwood and Division Creek plants, and is, primarily, the condition for which the by-pass and by-pass valve are therein installed. And in the event of the by-pass valve under the control of its dashpot being permitted through errors in adjustment or careless operation be permitted to return too quickly a damaging water-ram will be produced in the pipe line and, as testified to by Mr. Scattergood, this may reach a point where the pipe line will be broken. I might say that in my observation of the operation at the Cottonwood plant and Division Creek plant No. 2, previously testified to, I saw such movements distinctly take place not once but several times.

Q. 305 Is it not a fact that Lyndon describes and shows or attempts to describe and show a water wheel governor which will be sensitive to every slight variation of the speed of the water wheel?

A. That is true.

Q. 306 In the alleged infringing devices which you have testified concerning is there there shown a water wheel governor which will be sensitive to variations of speed of the water wheel to the same extent as that described and shown by the Lyndon patent in suit?

Mr. Blakeslee: Objected to as vague and indefinite.

A. I should say that there certainly was. The governors at both plants you have mentioned are highly sensitive.

Q. 307 Mr. Westall: Now, as briefly as possi-

ble, what great principle if any in waterwheel governing means do you conceive that Lyndon introduced into the art by the disclosures of the Lyndon patent?

Mr. Blakeslee: Objected to as calling for a mere repetition of testimony on the part of the witness. He has pointed out the features of the invention, analyzed the invention, interpreted the invention, and it does not seem that this is cross-examination in any sense. If counsel wishes to inquire as to the specific parts of the disclosure of the patent in suit, cross-examination may result.

A. I consider that Mr. Lyndon in the disclosure set forth in the patent in suit has introduced two new useful and extremely important principles which have come into extensive use, and by the use of which as disclosed by Mr. Lyndon have resulted in very much more satisfactory electrical service from hydro-electric plants. The two principles that I speak of are, first: that by preventing the overrunning of the governor which previous to Mr. Lyndon's invention resulted in an electrical service from hydro-electric plants that was erratic in voltage, and, therefore, in the supply of electricity to the various uses to which it was put, due to the speed fluctuations on account of the governor overrunning. Mr. Lyndon's invention prevented the governor overrunning, and, therefore, secured steady or constant voltage and prevented the flickering or wavering of lights and the speed of driving apparatus, as, for example, motors driving stamp mills, and concentrator tables in the min-

ing districts whose speed must be maintained constant to give good service. The service of electric current for driving mills and concentrators in the early days on this coast was defective in that the voltage varied, due to the overrunning of the water wheel governor to such a degree that many of the ~~many of the~~ mines would not, until after Mr. Lyndon's invention, use electric service for this purpose. The preventing of the governor overrunning enables a sufficiently accurate and constant electrical service to be supplied to make the service to mines adequate to meet their critical requirements. For example, if the speed is varied on a concentrator table the concentrates are either lost or the same degree of concentration not obtained. Hence the necessity of constant voltage and, therefore, constant speed which is only attained by preventing the governor overrunning. Second: The elimination of damaging effects, damaging to the governing and damaging to the safety of the pipe line, and, therefore, the power house and entire installation below the pipe line which might be and has heretofore frequently been, where breaks occurred in the pipe line, greatly damaged thereby due to the water from the broken pipe flowing down against the power house and over the property, interrupting the service and making necessary very extensive repairs. These he eliminated by permitting the quick movement of the water gate without reference to inertia effects in the pipe line and preventing any damaging inertia effect to the pipe line by by-passing the water synchronously

with the movement in a closing direction of the water gate and preventing the damage to the governing by permitting the quick movement of the water gate in a closing direction, and where the pipe line was long and the slope was gentle,—that is, the head was low,—enabling the governor to move in the opening direction with any required degree of rapidity and providing a corresponding closing movement of the by-pass valve so as to utilize the water velocity already existing in the pipe before such movement. I consider these two principles above mentioned as of the most vital importance to the art and as having been first disclosed and fully set forth by Mr. Lyndon, and as having subsequently been used to a very large degree with perfectly successful results.

Q. 308 By Mr. Westall: As briefly as possible will you state by what mechanical principles these results which you have described as being disclosed in the Lyndon patent were effected.

Mr. Blakeslee: Objected to as not cross-examination, these matters having been fully inquired into on direct examination of this witness and his answers thereupon having been full and complete, and, in fact, so full and complete that counsel at times objected to the attenuation thereof.

A My answer to your question is best recited in claims 3, 4, 6, 7 and 8, of the patent in suit, which may be read in to the record if you desire.

Q. 309 By Mr. Westall: Your counsel in question No. 66, on page 30 of the typewritten record, has used the following language as descriptive, I take it,

of a structure which he conceives would be an infringement of the patent in suit: "Have you seen any apparatus embodying a governor construction combined with a water gate and by-pass wherein the by-pass and water gate under the control of the governor operated inversely, each with respect to the other?" I will ask you to state if, in your opinion, a structure which could be appropriately so described would contain what you conceive to be the invention covered by any of the claims of the patent in suit?

A. Yes, sir.

Q. 310 Which of the claims?

A Claim 6 and probably others.

Q. 311 Which others?

A Well, Claim 7, Claim 8, Claim 9.

Q 312 Then, if I understand you correctly, you would say that that language would not describe a device which would infringe claims 1, 2, 3, 4, and 5 of the patent in suit?

A It might or it might not. Mr. Blakeslee's question does not go into the details of the governor. He merely mentioned certain elements. For example, he says "embodying a governor construction." A governor construction might readily infringe the claims of the Lyndon patent and still be described as a governor construction.

Q. 313 What would you add or subtract to or from the language quoted in the preceding question to make it an accurate description of a device which you would say contained the mechanical equivalents of Claims 1, 2, 3, 4 and 5 of the patent in suit?

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A I would use the language of the claims as thus descriptive.

Q. 314 But what element or elements would you add to that language to bring it within those claims?

Mr. Blakeslee: Objected to as having been answered by the witness, and, further, that the claims speak for themselves as to their terms, and, in order to answer the language of those claims, you would have to supply the parts called for by such language.

Mr. Westall: That is what I am asking the witness to do. I do not wish to have him read the claims into the record. I simply wish him to state—

A (Interrupting) I cannot state any more clearly than the language of the claim the elements covered by the claim. If you desire me to place in language the devices covered by said claims such that a governor construction would infringe such claims, the language I would obviously use would be the language of the claim. I don't 'see how I could do otherwise.

Q. 315 By Mr. Westall: Do you consider the following language used by your counsel at line 3, page 35, of the record in this case, as an appropriate description of a device which would be covered by any of the claims of the patent in suit: "A governor, a water gate, a by-pass, a means whereby the water gate and by-pass are inversely operated under the control of the governor?"

A. It is an abridged description of Claim 6.

Q. 316 Read the question. The question is not answered.

(The Examiner thereupon reads the question.)

A. Appropriate to the degree that the language goes of several claims.

Q. 317 Of which claims?

A. Claims 6, 7, 8 and 9.

Q. 318 Then you do not consider that the description which I have just quoted would be descriptive of a device which would infringe claims 1, 2, 3, 4 and 5 of the patent in suit?

A. As far as the language goes it is descriptive of the other claims in that it specifies a governor. The details of construction of such governor and the elements that enter into such governor he does not dwell upon. The same applies to the by-pass and by-pass valve. His description is as complete as it could be in a few words, and indicates clearly devices of the nature disclosed and claimed by Mr. Lyndon in the patent in suit.

Q. 319 But without adding other words as qualification or explanation to the language quoted, if I understand you correctly it would not describe a device, which in your opinion, would involve the invention claimed in claims 1, 2, 3, 4 and 5. Is that correct?

A. It would only indicate. Taken by itself, it is not sufficiently complete to cover an apparatus as disclosed in claims 1, 2, 3, 4 and 5, or the details of the apparatus in claims 1, 2, 3, 4 and 5.

Q. 320 Is there any element mentioned in any of claims 1, 2, 3, 4 and 5 which, if added to the language

quoted, would more nearly describe a device which you conceive would involve the invention in any of those claims?

A. The language of the claims themselves would be a better description of what is covered by said claims.

Q. 321 I am not asking you what is covered by the claims. I am asking you what element or elements in those claims should be added to the language which I have quoted to make that language descriptive of a device which you would say infringed those claims.

Mr. Blakeslee: Objected to as assuming something not in the testimony of the witness so far. The witness has never testified that anything should be added to the language under consideration to make the specific subject matter of claims 1 to 5 inclusive infringe the essence of the arbitrary wording under consideration, assuming that the wording were a claim in the patent in suit.

A. The language that should be added or used in order to describe a device which would infringe the said claims would be the language of the claims. In the language that you have mentioned, commencing on line 3 of page 35 of the testimony, "a governor" is a broad description of the detailed elements appearing in said claims 1 to 5 inclusive.

Mr. Blakeslee: The further objection is noted that if the question was directed at obtaining a response as to what would infringe said claims 1 to 5, in addition to the arbitrary language under consid-

eration, the question operates to alter the meaning of the said claims arbitrarily.

Q. 322 By Mr. Westall: You have made a distinction between claims 1, 2, 3, 4 and 5, and claims 6, 7, 8 and 9. What would you say is the particular distinction between those claims?

Mr. Blakeslee: The claims speak for themselves. If the question is directed to obtaining from the witness the construction of said claims, let the question so be put. As to the wording of the claims, such wording points the differences in terms.

A. I don't believe I can answer your question.

Q. 323 By Mr. Westall: Then, if I understand you correctly, the language quoted describes a device which would involve the invention disclosed in claims 6, 7, 8 and 9, but that you are unable to say whether the device so described would involve the invention of claims 1, 2, 3, 4 and 5.

Mr. Blakeslee: Objected to as assuming facts not testified to by the witness.

A. It might or might not.

Q. 324 By Mr. Westall: Under what conditions might it?

A. Under the conditions that the governor involved the devices more specifically set forth in claims 1 to 5 inclusive, it would not in the event of the governor not containing such devices.

Q. 325 Then if I understand you correctly, whether or not a device which could be correctly described by the language I have quoted would infringe claims 1, 2, 3, 4 and 5, would depend upon whether

or not that device contained in addition to the elements set forth in the language quoted those enumerated in claims 1, 2, 3, 4 and 5 as therein qualified? Is that correct?

Mr. Blakeslee: Now this line of examination assumes certain standards determinative of infringement and assumes several principles of law. I take it that the present proceedings are directed at determining whether the invention of the Lyndon patent in suit is found in the alleged infringing devices, what such invention is and what such alleged infringing devices are; and as to the matter of infringement, the same depends on a great many factors and, in so far as the questioning now and for some time previously indulged in concerns those legal determinations or legal conclusions as to the infringement, apart from interpretation of the patent and definition of the invention therein contained, a discussion and comparison of the alleged infringing devices, this line of questioning is objected to as calling for conclusions purely of law, which conclusions are not considered in the examination of the witness, but which must be arrived at in the presentation of the case before the court. Furthermore it is to be noted that the question of infringement concerns the entire invention in its full disclosure, and in such full interpretation and application as is brought out by the witnesses, and as to such interpretation and comparison there is no objection to the examination.

A. That is my opinion.

Q. 326 By Mr. Westall: You have testified that

you have taken out numerous patents on various hydraulic devices. Have you ever taken out or applied for any patent on water wheel governing apparatus?

Mr. Blakeslee: The question is objected to in so far as it pertains to any pending applications which the witness may be interested in, and the witness is informed that as to any such pending applications and the nature of the same or specific disclosures of the same, he may refuse to answer such questions unless directed by the court so to do.

A. I have so testified.

Q. 327 By Mr. Westall: Will you please give the dates and numbers of the patents that you have thus far taken out on water wheel governing mechanisms?

A. I don't know that I can do that at the present moment without searching the records. The records of the patent office on all issued patents are open to you and you will find that they are issued in my name, George J. Henry, Jr., during the last thirteen or fourteen years—quite a number of them. I can search in my files and answer the question more specifically if it is a vital matter to you.

Q. 328 Would the following language be descriptive of any of the structures or devices which you have heretofore described and illustrated as having been seen by you at the Division Creek No. 2 and Cottonwood plants in January of this year: "The combination of a water wheel; a nozzle through which water is delivered to propel the wheel; a second noz-

zle means for connecting such nozzles, valves for controlling ^{the supply to said nozzles & controlling} means connected with each valve and operating the valves simultaneously to open one and close the other.

Mr. Blakeslee: Objected to as irrelevant, immaterial, incompetent and not cross-examination.

A. If I were an examiner in the patent office and the description you have just given me was submitted as a claim, I would reject such claim on the Lyndon patent.

Q. 329 By Mr. Westall: You would therefore consider that such a device which could be appropriately so described would be an infringement of the Lyndon patent in suit? Is that correct?

Mr. Blakeslee: Objected to as assuming something not testified to.

A. That would be my first thought, but I would be open to argument to the contrary.

Q. 330. By Mr. Westall: Is it your opinion that a device or structure to which the description which I have quoted in my immediately preceding question would appropriately apply would embody the mechanical equivalent of a device constructed in accordance with the disclosure of the Lyndon patent in suit?

Mr. Blakeslee: The same objection, and it is not understood to be the province of the witness to draw claims of this issued patent. The patent has claims nine in number. They have been extensively considered and no further claims can be before the court and, as a matter of fact, the determination of a patent

depends upon the reading of the claims, together with consideration of the specifications and drawings and the invention therein and thereby disclosed.

A. I am inclined to think it would.

Q. 331 By Mr. Westall: Is there any doubt in your mind whether it would or not?

A. I would not care to answer the question with any greater degree of positiveness than I have without exhaustive consideration. The art is becoming highly developed and there are a great many devices that I would desire to review carefully and compare with the Lyndon specifications, drawings and claims, before I would feel justified in giving any more positive answer.

Q. 332 Can you suggest any element or elements which should be added to the language I have set forth which would make it a more appropriate description of the alleged infringing devices at the Cottonwood plant and the Division Creek No. 2 plant?

Mr. Blakeslee: The same objection as previously noted, and it is objected to that this is not cross-examination. If counsel wishes the witness to further define these embodiments and the organization and construction of these plants, let him ask the witness so to define them. If, on the other hand, he persists in this line of questioning and in his attempts to get the witness to construe language framed by him relative to these plants and the invention of the Lyndon patent in suit, we shall ask the court to consider that counsel is making, as he has apparently been attempting for some time to make, the witness

his own witness, and to consider the present testimony of the witness accordingly. This is a cross-examination or is supposed to be, and we contend that the proper time for the defendant to take testimony in defense is the time allotted for that purpose and not the time properly to be utilized in cross-examination.

A. I would substitute for the descriptive language you have given the language of the Lyndon claims.

Q. 333 By Mr. Westall: Which of the Lyndon claims?

A. 6, 7, 8 and 9, and it might be, upon more mature consideration, if I were allowed time to exhaustively study the language and the art, I might then add other claims of the Lyndon patent.

Mr. Blakeslee: At this moment and in view of the question just asked and for the reasons just stated, we ask that this question and the preceding question and all other preceding questions, together with the answers to all of the same, which have been directed at obtaining from the witness a construction upon certain language formulated by the complainant as purporting to be pertinent to the invention of the patent in suit and to the installations in the alleged infringing plants, be stricken from the record and withheld from consideration as not cross-examination.

Mr. Westall: Counsel for the defendant points out that this witness has testified as an expert and that he has exhaustively pointed out on direct exam-

ination and upon prior cross-examination what he conceives to be the mechanical equivalents of the devices shown, described and claimed in the Lyndon patent in suit, and that these questions are only directed to having him further describe in other language so that we may have his meaning entirely clear upon this record as to what he saw at the said Cottonwood and Division Creek No. 2 plants which are alleged to be infringements.

Mr. Blakeslee: There is a vast difference between properly tracing equivalence between the disclosures of a patent alleged to be infringed and the things alleged to infringe the same, on the one hand, and the attempted development of equivalence between the disclosure of the patent alleged to be infringed and certain arbitrary words thus framed and formulated on cross-examination and not shown and not built upon or said to be built upon the things alleged to be infringed. This latter procedure is not cross-examination. It pertains to the development of the defense, if to anything material to determining the issues of the case. And we persist in our motion just made.

Q. 334 By Mr. Westall: Does the following language correctly describe the structure and devices which you have testified on direct examination as having been seen by you at Division Creek No. 2 and the Cottonwood plant in January of this year: "The combination of a water wheel, of a nozzle at one side of the wheel, and through which water is supplied to propel the wheel, a second nozzle, means

of connecting the nozzles, valves within said nozzles and means connected for each valve to simultaneously open one valve and close the other?"

Mr. Blakeslee: The same objection is noted and the motion just made is repeated with respect to this question, and counsel is notified that if this kind of questioning is persisted in a motion will be made at the proper time to tax against the defendant the entire cost of taking and transcribing and returning the cross-examination record of the present witness.

Mr. Westall: Counsel for the defendant states that the previous suggestion of counsel is entirely superfluous and unnecessary, and is merely a repetition of prior threat of that nature.

A. No, sir.

Q. 335 By Mr. Westall: In what respect is the description just referred to inaccurate?

Mr. Blakeslee: The same objection and notice is repeated.

A. It would appear to me that there is no nozzle on the side of the wheel in the alleged infringing structures.

Q. 336 By Mr. Westall: In other respects would you consider the description accurate?

Mr. Blakeslee: The same objection and notice.

A. No; I would not consider it accurate.

Q. 337 By Mr. Westall: In what other respects is it inaccurate?

Mr. Blakeslee: The same objection and notice is repeated.

A. I would not care to specify wherein it was

inaccurate without an exhaustive consideration of the description you have given before me and a careful study of the devices to be compared therewith.

Q. 338 By Mr. Westall: If I understand you correctly, then, you are unable to state whether or not the language which I have quoted to you in the preceding question is an accurate description of the devices alleged to have been seen by you at the Division Creek and Cottonwood plants? Is that correct?

Mr. Blakeslee: The same objection and notice is repeated and this is to be understood as repeated to all questions put along this line of alleged cross-examination.

A. I do not believe it to be an accurate description.

Q. 339 By Mr. Westall: Why do you not believe it to be an accurate description?

A. I have already answered that question.

Q. 340 The only respect, then, I take it, in which you find it to be inaccurate is that stated in your previous answer? Is that correct?

A. That, and possibly others which I could develop on more mature consideration, and it is at least inaccurate in that degree.

Q. 341 What others do you believe you might point out on mature consideration?

A. I could not say without mature consideration, in advance.

Q. 342 How much consideration or time would you need to spend?

A. I might want an hour and I might want a day. If you leave the question with me I will be very glad to answer your question specifically later on in the case.

Q. 343 Very well. Then let the record show that the full answer to the question be postponed until later in the case.

Mr. Blakeslee: In view of the persistence of this line of inquiry, I ask that the Special Examiner immediately transcribe or have transcribed under his direction the language under consideration, and that the same, approved by the Examiner, be forthwith handed to the witness.

January 24, 1914 P. M.

Prof. Henry Dr. was thereupon recalled and his cross examination resumed

Q. 344 By Mr. Westall: During the intervening adjournment have you succeeded in sufficiently considering to be able to answer the question which was held over from the preceding session?

A. No, sir.

Q. 345 Do you expect to be able to answer that question after further consideration?

A. Yes, sir.

Q. 346 Now, I understand from your explanations of the operation of the alleged infringing devices as disclosed in the drawings and photographs which have been produced, that the opening of the auxiliary nozzle has the effect of reducing or retarding the speed of the water wheel, and the closing of such nozzle has the effect of accelerating the speed of the water wheel. Is that correct?

A. It has the effect of reducing to a minimum the

inertia effects of the water, which water would through the water gate or main nozzle, if those inertia effects existed, produce the defective results previously testified to.

Q. 347 To answer the question directly, would you say broadly that that is the effect of opening and closing such nozzles?

A. No; I would not.

Q. 348 Referring now to the line drawings U and V which you have offered in evidence, please state whether the exact placing of this water wheel as here indicated by you would have any effect upon the question of identity of the alleged infringing devices and that of the patent in suit.

A. Yes, sir; it would, in that the water wheel must of necessity be in the path of the water from the needle nozzle or water gate and must be clear of the by-pass valve or the path of the jet from the by-pass valve.

Q. 349 So if I understand you correctly, if the jet of the by-pass valve struck the water wheel in any way that there would be a departure even though all the other elements and arrangements of the devices which you have described as being infringing devices, were constructed in the exact manner in which you have pointed out and described?

A. That would be a variation from the patent in suit and from the apparatus as installed in the alleged infringing devices.

Q. 350 So that merely the placing of that wheel so that it would be struck by the water from the by-

pass valve, in your opinion, even though all the other elements were assembled in the exact manner in which you have testified they were assembled, would avoid the charge of infringing.

Mr. Blakeslee: The foregoing objection and notice are considered as repeated, and the attention of the court is directed to the manifest fact that the defendant's counsel is trying to put in a defense in cross-examining the witness. Any defense that is set up in the defendant's answer cannot be presented at this time nor is any comparison of the disclosure of the patent in suit proper with any other devices or constructions than those which are before us and concerning the disclosure of the patent in suit and the construction of the alleged infringing devices.

Mr. Westall: Counsel for the defendant points out that he is not at this time speaking of any defenses that have been set up in the answer. He is putting certain hypothetical questions to the witness based upon his previous testimony explaining the mechanisms here involved, and these questions are merely directed to a further elucidation of those mechanisms and devices.

A. No; you did not understand me correctly. I have not so testified.

Q. 351 Will you please read the last question?

(The Examiner thereupon reads the last question.)

Mr. Blakeslee: The further objection is noted that counsel is manifestly making the witness his own as he has been doing for some time and I will

ask the court to keep this in mind during the continuation of this line of inquiry.

Q. 352 My Mr. Westall: Then I understand you to say that the placing of the water wheel so that it will be struck by water from the by-pass valve would not necessarily be such a vital change in the structures which you have described and illustrated as you would be willing to say would affect the charge of infringement? Is that correct?

A. I would not be willing to say that the case that you have assumed would be one which would necessarily avoid infringement.

Q. 353 Will you please state your reasons, if you have any, why the placing of the water wheel in the manner in which I have suggested might or would not be a departure from the invention of the Lyndon claims or any of them.

A. I would have to have before me a drawing showing the device that you have in mind, and compare such device with the claims of the Lyndon patent, in order to intelligently answer your question.

Q. 354 Well, taking up, for instance, Claim 6 of the Lyndon patent: Would you say that the device constructed and arranged as you have testified as having seen at the Cottonwood plant and Division Creek No. 2 plant, but having the water wheel placed so as to be struck by the water from the by-pass valve, would not be the mechanical equivalent of said Claim 6.

Mr. Blakeslee: This question is further objected

to as indefinite and does not fully convey what may or may not be in counsel's mind with respect to the points of the wheel to which the water might so be directed against, whether at the same side or at the opposite side of the wheel.

A. I would have to have before me a drawing or sketch showing the device that you have in mind, to answer your question intelligently.

Q. 355 By Mr. Westall: Well, then, assuming that the wheel was placed as I have shown it in the red dotted line on Complainant's Exhibit V, would you say that a device constructed in every other way in accordance with the device which you have described and illustrated as being in use in the Division Creek and Cottonwood plants, but with the exception that the wheel was placed as so indicated, would not contain in your opinion the mechanical equivalents of any of the claims of the patent in suit?

A. I should not like to answer that question without a great deal of consideration. The question of whether or not a device infringes another or the claim of some invention, is one that cannot be answered hurriedly. I would want to weigh very carefully the operation, the means involved and the effects in the adaptation in the device in actual practice as compared with the device built under the claims. I might say that no such arrangement as you have indicated in the red dotted line exists in the combination of devices at the Division Creek No. 2 plant or the Cottonwood plant previously testified to, and I cannot at the moment conceive of the devices

of these two plants being arranged in a manner such as you have shown, of producing a satisfactory operating result.

Q. 356 With a water wheel placed as I have indicated in the red dotted line, would you say that the language of Claim 6 is an inappropriate description of any of the alleged infringing devices as so modified?

A. I will repeat my last answer in regard to that.

Q. 357 Then, if I understand you correctly, you would not care to say that the language of Claim 6 would be an appropriate description of the device so modified? Is that correct?

A. I would not consider that modification, as you have shown it in the red dotted line in drawing Exhibit V and as assumed in your question, would be described as in Claim 6 of the Lyndon patent in suit.

Mr. Blakeslee: The motion previously made to strike from the record and withhold from consideration is repeated particularly with respect to the last question and answer, as upon the face thereof the inquiry is directed at comparison between the disclosure of the patent in suit and something else arbitrarily at variance with anything before us, proven or alleged to be in infringement of the patent in suit.

Q. 358 By Mr. Westall: Referring now to the drawings of the patent in suit, please point out and indicate what part or parts you understand are meant by "means for returning the by-pass valve to normal position on completion of governing movement of the water-gate-operating means."

Mr. ^aBalkeslee: Objected to as not cross-examination.

A. I do not understand that the by-pass valve returning means is set into operation at such a time. It may be acting at a very slow rate, but as far as its influence is concerned during the—

Q. 359 (Interrupting) I don't believe that you get the question. Will you read the question, please?
(The Examiner thereupon read the question.)

A. Dashpots and weights 69 and 70 are shown, two in number, in Lyndon patent for this purpose. In some instances but one of these pairs might be used and in some instances neither of them.

Q. 360 Is there any indication in the specifications or drawings of the Lyndon patent in suit that suggests that one or both of these might be dispensed with?

A. Yes, sir.

Q. 361 Where is it?

A. Claim 6.

Q. 362 Then, if I understand you correctly, it is your understanding that because Claim 6 does not include the means for returning the by-pass valve to normal position on completion of governor movement of the water-gate-operating means that you understand that as an indication that the patentee considered that they might be left out of his device? Is that correct?

A. That is correct, with the understanding that the device remaining would still involve elements of his invention.

Q. 363 Referring now to the photographs and drawings which have been offered in evidence of the alleged infringing devices, please indicate briefly without explaining their operative connections the parts, if any, which you conceive are the equivalent of means for returning the by-pass valve to normal position on completion of the governing movement of the water-gate-operating means.

A. I previously testified that such element exists in the apparatus at the Division Creek No. 2 plant and at the Cottonwood plant as in Complainant's Exhibit H, the oil-actuated dashpot with its side springs as shown in the part lettered OO. In Complainant's Exhibit I these parts are indicated at OO, SS and WW. In the case of the Cottonwood installation this device does not show in the photographs on account of its being in the dark portion of the nozzle pit behind the apparatus shown in Exhibit F. Both of these dashpots are very clearly shown in the line drawings Complainant's Exhibits U and V, and marked "oil dashpot."

Q. 364 Claim 8 of the patent in suit calls for the by-pass normally held in partially open position. Do you find anywhere in the alleged infringing devices a by-pass valve normally held in partly open position?

A. As previously testified to in your cross-examination, I stated that at the Division Creek plant the by-pass valve was normally held in partly open position while the water wheel apparatus was under inspection by Mr Daehler and myself. At the Cottonwood

plant the by-pass valve appeared to be closed or nearly closed during the periods of governor inactivity. During periods of governor activity its average position was off of the valve seat to a greater or less degree.

Q. 365 How do you know that such valve at the Division Creek plant is held in normally partly open position?

A. By inspection.

Q. 366 You believe that to be the normal position that you observed at that time?

A. It was the normal position during the period that I examined the plant. I doubt very much if it is kept open normally during any material degree during governor inactivity. The probability is that the valve is allowed to return to full closure or very nearly full closure upon the completion and cutting-out of the governor mechanism. I do not consider such position normal position in the same sense that I do normal position during periods of governor inactivity.

Q. 367 So that if you did say that the normal position of both valves at the plants which you have inspected would under ordinary circumstances of governor inactivity be closed, is that correct?

A. Substantially so; and during periods of governor activity would be open and in reverse connection with the water gate and in reverse operative movement with the water gate or needle valve.

Q. 368 Do you consider that the valve held in normally closed position such as you have described,

is a mechanical equivalent of a valve such as described in the Lyndon patent as being held in normally open position?

A. Well, a closed valve is not the same thing as an open valve. I consider that the valves are mechanically equivalent in the sense that they are substantially the same devices for producing the same results.

Q. 369 Point out in the drawings of the patent in suit the controller of Claim 8 responsive to the speed of the water wheel and controlling said reversing means.

A. Solenoid 33.

Q. 370 Briefly enumerate in the photographs and drawings of the alleged infringing devices the parts which you conceive to be the equivalent of a controller responsive to the speed of the water wheel and controlling such reversing means.

Mr. Blakeslee: Objected to as calling for a third repetition of the same testimony on the part of the witness.

Mr. Westall: Counsel for the defendant suggests that this testimony has reference to a claim which has not yet been inquired about on cross-examination and which is alleged to be infringed.

A. As pointed out above in cross-examination, I consider that the controller responsive to speed changes in the device which I testified to previously in connection with the photographs of the alleged infringing apparatus as being such controller.

Q. 371 Please point out briefly in the drawings

in the patent in suit the parts you understand are meant by the language of Claim 8 "means operated by said controller to bring the aforesaid clutch into operation and to release said clutch when the governing action is affected"?

A. I have pointed out said elements very fully in my answer to question 140 on page 121 of the record.

Q. 372 I will ask you to point out in the alleged infringing device any part or parts which you conceive to be accurately described as means operated by said controller to bring the aforesaid clutch into operation and to release said clutch when the governing action is effected.

Mr. Blakeslee: Objected to as incomplete, as "these means" are not located in any way, and there is no reference made to anything to identify "these means".

Mr. Westall: I am asking the witness to identify the means and point them out in the alleged infringing devices.

Mr. Blakeslee: It is noted that reference is made to "said controller" and unless the controller is identified, how can anybody make out what means are meant?

Mr. Westall: Counsel for the defendant points out that infringement of that claim is charged and that the means mentioned in part of the claim, and in order to find infringement it must be found or its mechanical equivalent must be found in the infringing devices.

Mr. Blakeslee: No reference has been made in the question to any claim.

A. If you have reference to any of the wording in Claim 8, I repeat my answer as given in the answer to question 140, to which I have directed your attention in my last answer.

Q. 373 By Mr. Westall: What part do you understand is meant in the language of Claim 9 by "a clutch, adapted to connect such operating means with the water-gate-operating shaft"?

A. In the Lyndon patent this refers to the clutch actuated through magnet 64.

Q. 374 Please point out briefly the part or parts in the alleged infringing structure which you conceive to be the equivalent of a clutch adapted to connect such operating means with the water-gate-operating shaft.

A. The mechanical equivalent I should consider might readily be construed to be, and I would so consider it to be, the oil dashpots.

Q. 375 Do you include in the oil dashpots any other mechanism than simply the casing of the oil dashpots and the piston?

A. Oh, yes; the oil dashpot and its associated parts.

Q. 376 Mention its associated parts.

Mr. Blakeslee: Objected to as calling for mere repetition of testimony given by the witness previously.

A. All those parts which affect its movement, and the oil flow, and that influence the relative move-

ment between the by-pass valve stem and the water-gate-operating shaft, all as previously testified to.

Q. 377 By Mr. Westall: Where, if at all, in the alleged infringing device do you find the electro-magnetic device connected to such dynamo of Claim 9?

A. I do not find any such electro-magnetic device in the alleged infringing apparatus.

Q. 378 Where, if at all, in the alleged infringing devices do you find a controller operated by said electro-magnetic device and controlling the said reversing gear?

A. I find a controller as testified to a number of times before, but such controller is not actuated by an electro-magnetic device.

Q. 379 Please point out briefly in the alleged infringing device the part or parts which you conceive to be appropriately described as "a magnetic device controlling the aforesaid clutch with the by-pass-operating means" as called for in Claim 9 of the Lyndon patent in suit?

A. I do not find any magnetic device in the alleged infringing device as you have described.

Q. 380 Please also briefly point out in the alleged infringing device any part or parts which you conceive to be appropriately described as "a circuit for said magnet and means operated by said controller in its movement in either direction to close such circuit."

Mr. Blakeslee: Objected to as impossible of answer in view of the previous answer of the witness, that there is no magnetic device in this alleged

infringing apparatus. So how can there be any circuit for such magnetic device which device does not exist?

A. I do not find any circuit for electrical energization of any parts or any electro-magnet parts as mentioned in your last several questions in the alleged infringing apparatus.

Q. 381 By Mr. Westall: Do you find the mechanical equivalents of such magnetic devices in the alleged infringing devices?

A. The mechanical equivalent of the "dynamo connected with the water wheel" is the fly-ball element sensitive to speed change; the electro-magnetic device and controller operated thereby is the winding of the solenoid; the solenoid and its plunger; and in the alleged infringing apparatus it is what I have previously testified to as the controller. The mechanical equivalent of the magnetic device controlling the aforesaid clutch to the by-pass-operating means has for its mechanical equivalent in the alleged infringing apparatus all dashpots connecting the by-pass needle stem to the water-gate-operating means. The mechanical equivalent of the electric circuit which would energize such magnet is the transmission of movement through the several parts above specified.

Q. 382 You have testified that Exhibits U and V were line drawings showing the interior construction of the nozzles and their alleged governing means which are said to be infringements of the patent in suit. I will ask you to state how you know the noz-

zles and their needle valves are constructed as shown in said Exhibits.

A. I did not use the word "interior" in my description of these drawings, because they only show the needles and needle valves as dotted lines. I also stated that they were not dimension drawings but were approximately correct as regards the dimensions, valves, and valve parts. I have seen many of these devices in operation and I am thoroughly familiar with their general appearance and outward and inward characteristics, and particularly with what takes place in the water wheel pit and surrounding apparatus. From my knowledge of these matters I know the present drawings to be correct in regard thereto, as previously testified.

Q. 383 In regard to the construction of the springs shown in the oil dashpot and its adjusting means, how do you know that you have in the drawings referred to correctly represented those details?

A. The springs and other parts that you have mentioned and that I have represented clearly show in the photographs of the apparatus, Complainant's Exhibits E to P inclusive.

Q. 384 Do you consider that the fly-balls G in Exhibit E and Exhibit G and the fly-balls CC in Exhibits J, K and H, are responsive to speed variations of the water wheel to the same extent as contemplated by Lyndon in the disclosures of the patent in suit?

A. Substantially so.

Q. 385 When you say "substantially so", do

you mean that the Lyndon disclosure showed a device which would be more or less sensitive to speed variations?

A. I believe the electro-magnetic means that Mr. Lyndon has described would be slightly more sensitive.

Q. 386 Can you state positively that you have never seen prior to the date of the Lyndon patent in suit a water-wheel-governing device where a by-pass valve and a water-gate operating inversely to each other, responsive to changes in speed of the water wheel, through the agency of the governor?

A. I can.

Q. 387 How do you fix the date?

A. I fix the date by my knowledge of the art at about that time being gained first through a study of patents. During the year 1898 I returned to San Francisco from New York. During the years 1900 and 1901 I first began to be considerably interested in patents and their disclosures. I did not make any exhaustive study at that time of any patents, but my attention was directed to patent matters in my practice to a greater degree than it had been earlier. I was therefore particularly interested in any new ingenious and useful devices during the years 1900 or 1901 upon seeing such a device or any of the devices disclosed by Lyndon and to which I have testified as being new, and I am sure that my attention would have been fixed upon them. I am certain that I had not previously seen such devices as I had visited comparatively few water-wheel plants at that

time,—probably not more than twenty-five or thirty,—and the devices which I had seen in them were therefore quite familiar to me during the years 1900 and 1901. I had been in hydraulic engineering professional work only about five years, and my memory was therefore such that the devices I had seen would have been familiar to me. And had I seen any devices which would have accomplished the results shown in the Lyndon patent in suit, it could not help but have made an impression on me which would have persisted not only to the years 1900 and 1901, but to the present time.

Q. 388 And what do you consider the broadest claim of the Lyndon patent in suit?

Mr. Blakeslee: Objected to as calling for a conclusion of law.

A. I don't know.

Q. 389 Is it your idea of the doctrine of mechanical equivalence that any water-wheel governor or electrical means in a water-wheel governor in which there is the combination with means for operating the water-gate in either direction, a by-pass for the water-wheel, and a valve controlling said by-pass, of means connected to the water-gate-operating means and operating the by-pass valve inversely to the operation of the water-gate, would contain the invention to be an infringement of the Lyndon patent in suit?

Mr. Blakeslee: The objection and notice of motion heretofore made and repeated relative to a requested comparison by the witness of the disclosure

of the Lyndon patent with arbitrary word-things formulated by counsel, are repeated, and it is again called to the attention of the court that counsel has persisted in making the witness his own.

Mr. Westall: Counsel for the defendant simply suggests that if counsel for complainant would have been watching the wording sufficiently he would have noticed that I am only quoting Claim 6 of the patent in suit.

Q. 390 The question is withdrawn. ^{It} It is your idea of the doctrine of mechanical equivalence that any water-wheel governor in which is found the combination with means for operating the water-gate in either direction, a by-pass for the water-wheel, and a valve controlling said by-pass, of means connected to the water-gate-operating means and operating the by-pass valve inversely to the operation of the water-gate, regardless of the form of that water-wheel governor, would be the mechanical equivalent of the devices shown and described in the Lyndon patent in suit.

Mr. Blakeslee: The equivalence as between the alleged infringing structures and parts thereof, and the disclosure of the patent in suit, is open to consideration in this testimony. On the other hand, the doctrine of equivalence is a legal doctrine, and we object to the question as calling for an opinion of law on the part of the witness.

A. If the devices enumerated in said claims were for accomplishing substantially the same results in

substantially the same manner, I would so consider it.

Q. 391 By Mr. Westall: If they were for the purpose of accomplishing the same results in substantially a different manner but included the elements combined as set forth in Claim 6 of the Lyndon patent, would you consider them to embody the mechanical equivalent of the devices shown and claimed in the Lyndon patent in suit?

Mr. Blakeslee: The same objection. Counsel should not attempt to clothe the witness with a judicial function.

Mr. Westall: Counsel for the defendant disclaims any desire or purpose of usurping the functions of the court. He simply points out that this witness has testified concerning what he conceives to be mechanical equivalence of the devices shown and described in the Lyndon patent in suit, and the question is merely directed to ascertain how far the witness conceives the identity of mechanical means and devices may be carried.

Mr. Blakeslee: And we reply that it is immaterial and irrelevant and incompetent. Whatever the conception of the witness may be in this direction, the application of the doctrine of mechanical equivalence is for the court and solely for the court. A witness can call things equivalent. It is for the court to say whether they are.

Q. 392 By Mr. Westall: Can you conceive of any water-wheel governor embodying the elements set forth in Claim 6, and of which Claim 6 might be

appropriately descriptive, and accomplishing the same result or substantially the same result as Lyndon, that in your opinion would not be the mechanical equivalent of the devices shown in the Lyndon patent in suit.

Mr. Blakeslee: The same objection. The conception of the witness is absolutely irrelevant in this respect: there is nothing to deal with in cross-examining the witness as to structures pertaining to the issues of infringement other than those of the Lyndon patent in suit and those alleged to infringe the same.

A. I cannot say.

Q. 393 By Mr. Westall: You say that you cannot conceive of such——

A. No. I said I could not say. I could not say whether I could conceive of it or not. I might be able to conceive of such a thing if there was some concrete presentation, and if my thoughts were directed along certain specific lines that you may have in mind. For me to say in the abstract that I might or might not be able to conceive of something, is difficult, until the conception is presented either in my thoughts or by you to me.

Q. 394 There are certain contacts, namely, those at 45, 46, 103 and 104, which have been illustrated and described in your previous testimony as being mercury contacts. Is there anything in the patent in suit which would lead you to believe that Lyndon contemplated that those contacts should be mercury cups?

A. As I have previously testified, Lyndon clearly shows in Figure 6 on the patent in suit that he has in mind liquid or mercury contacts.

Q. 395 But I understand that there is nothing in the specifications other than the drawing that you have mentioned which indicates that he had that idea in mind. Is that correct?

A. He refers to the figure in his specifications, and I understand the figure to be a part of the specifications. Other than that I know of no reference.

Q. 396 As to the contact at 103 and 104, is there anything in the drawings that shows those contacts to be mercury contacts?

A. Mercury contacts are quite old in the art and fairly well known to anyone dealing with the designing and construction of electrical devices such as Mr. Lyndon discloses, and I cannot conceive of any better disclosure of his intentions in this regard than that of Figure 6. It certainly does not require any invention or should not be necessary to incumber the specifications with any further reference to contact being liquid or mercury contacts than that disclosed in Figure 6.

Q. 397 But you have not answered my question directly. I was asking you only with regard to the contacts 103 and 104.

A. I consider the disclosure of Figure 6 ample in regard to making the intention clear on this point.

Q. 398 I am not speaking of the intention, but I am speaking of the actual drawing. Does it show or does it not show mercury contacts at 103 and 104?

A. I consider that it does only to the extent that he has brought in Figure 1 as substantially the same contacts, 45 and 46, and, as such, I would assume them to be. I do not find any other disclosure indicating mercury contact than that previously testified to.

Q. 399 So that it is necessary to assume that those two contacts are mercury contacts. Is that correct?

A. It is necessary for one who is at all familiar with the art to apply ordinary intelligence to interpreting Mr. Lyndon's disclosure.

Q. 400 Now, you testified that mercury contacts are old. Solenoids are still older, are they not?

A. I don't know which is the older, but they are both quite old.

Q. 401 And how about magnets such as shown at 15 and 16 and 32 and 64?

A. The same applies.

Q. 402 And electrical circuits such as shown and described by Lyndon. Is there anything new with the Lyndon patent in those?

A. There is nothing new in the establishment of electrical circuits.

Q. 403 Is there anything new in using a solenoid to operate a clutch?

A. I don't think so.

Q. 404 So that any novelty of the Lyndon patent does not reside in the specific means that he has employed for actuating the different mechanisms controlling the valves?

A. I cannot say that because——

Q. (Interrupting) I am saying, the specific means employed.

Mr. Blakeslee: Objected to as indefinite.

A. I cannot say that there is any novelty in some of the specific means. There is no novelty in those parts mentioned in the previous three answers.

Mr. Blakeslee: We will concede that solenoids and electro-magnets and electrical paths through circuit wires were old at the time of the Lyndon invention.

Q. 405 By Mr. Westall: Then it would be proper to say, would it not, that the essence of what was contributed to the art by Lyndon was the inverse operation of the gates for the purposes which he has shown and described. Is that correct?

A. I have already answered your question very fully as to the essence of the Lyndon invention earlier in this cross-examination, and do not see now how I can further amplify in regard thereto.

Q. 406 Regarding the consequences of the energization of the different magnets and their resulting operations, is it not a fact that unless the contacts at 45, 46, 103 and 104, and at 40 and 41, are mercury contacts, that there can be no succession of the energization of the different magnets such as you have described?

A. Oh, no; there are other ways of doing it. We might use metallic contacts on springs, and probably other ways besides that. But it at least occurs to me as an alternative method.

Q. 407 But adopting specifically the device disclosed by the Lyndon patent, without any material alteration of the parts, is it not necessary to have mercury contacts at the places I have indicated?

A. No; I do not so consider it. My last answer would apply in this case.

Q. 408 When you took up the subject of purchasing this patent from Mr. Lyndon was there any correspondence between you in regard to alleged infringements which you have testified to in this case?

A. There was not.

Q. 409 When Mr. Lyndon first wrote to the Pelton Water Wheel Company as you have testified, four or five years ago, with what specific installation, if any, was his letter in reference to?

Mr. Blakeslee: In so far as this question involves or may involve and apparently does and must, matters pertaining to the interests and records of a company with which the witness has testified he was then associated, the question is objected to as improper on the ground that it may cause a breach of confidence on the part of the witness if answered, and that it calls for matters irrelevant, incompetent and immaterial to any issues which have been so far developed in this case. And the witness is informed that he may use his discretion in answering this question unless, of course, ordered to answer it by the court.

A. I do not know now, and I believe that I never did know.

Q. 410. By Mr. Westall: As chief engineer of

the Pelton Water Wheel Company it is a part of your duties to consider bids for work taken by that company, was it not? That is to say, to consider the type and styles of devices which the Pelton Water Wheel Company contemplated putting in.

Mr. Blakeslee: Objected to as calling for a repetition of the testimony in direct by this witness.

A. Yes, sir; it was.

Q. 411 By Mr. Westall: As chief engineer of the Pelton Water Wheel Company you considered and advised with other officers of that company in relation to certain work on the Los Angeles aqueduct, did you not?

Mr. Blakeslee: The objections last previously made are repeated.

A. I believe so.

Q. 412 By Mr. Westall: And as such engineer you put in a bid on the part of the Pelton Water Wheel Company? With your advice, assistance and direction they put in a bid for that work, did they not?

Mr. Blakeslee: The same objection.

A. I believe so.

Q. 413 And that bid was put in in competition with the Abner Doble Company, was it not?

Mr. Blakeslee: The same objection.

A. I don't remember.

Q. 414 By Mr. Westall: The Pelton Water Wheel Company offered, did it not, to put in the hydraulic plants at Division Creek No. 2 and Cottonwood plants, did they not?

A. There is no desire on my part to avoid making this matter very clear, but to do so I might state that I have no knowledge and do not believe that I had any knowledge at the time as to the exact location of the apparatus being tendered for, and in regard to which you have asked. I remember very distinctly that the Pelton Water Wheel Company, as represented by me at the time, put in a tender to the city of Los Angeles for certain work on one of their construction plants. I saw on the 2nd of January this year certain apparatus in the Cottonwood plant which I believe to be the same apparatus, being the water-wheel unit No. 1 in the said Cottonwood plant as distinguished from water-wheel unit No. 2, about which nearly all of this testimony has been given. By referring to Complainant's Exhibit R, I will say that the more distant unit—that on the extreme right hand—is what is known as unit No. 2, and in regard to which there has been full discussion and disclosure and alleged infringement in the present case. The No. 1 unit, which is in the foreground, is, I believe, the Pelton unit about which you have asked me.

Q. 415 By Mr. Westall: The apparatus put in by the Pelton Company involved water-wheel governors, did it not?

pressure
A. It involved a Lombard type R vertical oil gusher governor, as previously testified.

Q. 416 And needle valve and by-pass constructed substantially in accordance with either the line drawings U or V?

A. No, sir.

Q. 417 In what respect did it differ?

A. In that it was a deflecting nozzle containing a hand control needle valve, the water jet being deflectable from the wheel through the action of the governor.

Q. 418 Did the Pelton Company put any bids in for any of the work on the line of the aqueduct involving any other form of nozzles than the one of the deflecting type which you have described?

Mr. Blakeslee: The same objection.

A. I don't know.

Q. 419. By Mr. Westall: Is it not a fact that the Pelton Water Wheel Company did put in a bid to do certain work in connection with some of the plants on the line of the aqueduct, involving a device substantially in accordance with that described by you as being in use at the Division Creek and Cottonwood plants?

Mr. Blakeslee: Objected to as irrelevant, immaterial and incompetent.

A. I have already answered this in my previous answer which I now repeat.

Mr. Westall: I believe that is about all.

Mr. Blakeslee: I will not proceed with the redirect examination of the witness and then, in accordance with the reservation made when the witness was last excused, to recall the witness for further direct examination, subject, of course, to the right of counsel for the defendant to re-cross upon such direct.

REDIRECT EXAMINATION.

By Mr. Blakeslee:

Q. 420. I believe, Mr. Henry, that you testified that

there was a gate-operating shaft "D" shown in photos Exhibits E to P. What is the designation of this operation shaft in these photos?

A. "D" in Complainant's Exhibits E, F and G, and "HH" or "LL," as these latter two are connected together, in Exhibits H and J.

Q. 421. Now, you have testified that Lyndon's explanations and disclosures in the patent in suit, taken with your explanations, are enough for one skilled in the art to fully understand the Lyndon device. Please state as to whether or not Lyndon's explanation in the patent as the disclosure in the patent in suit is sufficient to enable one skilled in the art to understand the invention without your explanations as given in testimony?

A. I so consider it.

Q. 422. Will you please compare Complainant's Exhibit Z and ZZ with any corresponding device shown in Complainant's Exhibits E to P inclusive.

A. The devices shown in Exhibit ZZ are all clearly shown in the same relative operative combination in Complainant's Exhibits E and G of the Cottonwood plant, in Complainant's Exhibits H, J and K at the Division Creek plant, and in Exhibit R, which latter exhibit I also include to show the devices illustrated in Exhibit ZZ, in both units in the Cottonwood plant, thus making three governing devices in these two plants involving the elements disclosed in Exhibit ZZ.

Q. 423. And do the designating wordings upon Complainant's Exhibit ZZ applying to the several parts and groups of parts, apply correctly to the corresponding part in the exhibit photograph to which you have just referred?